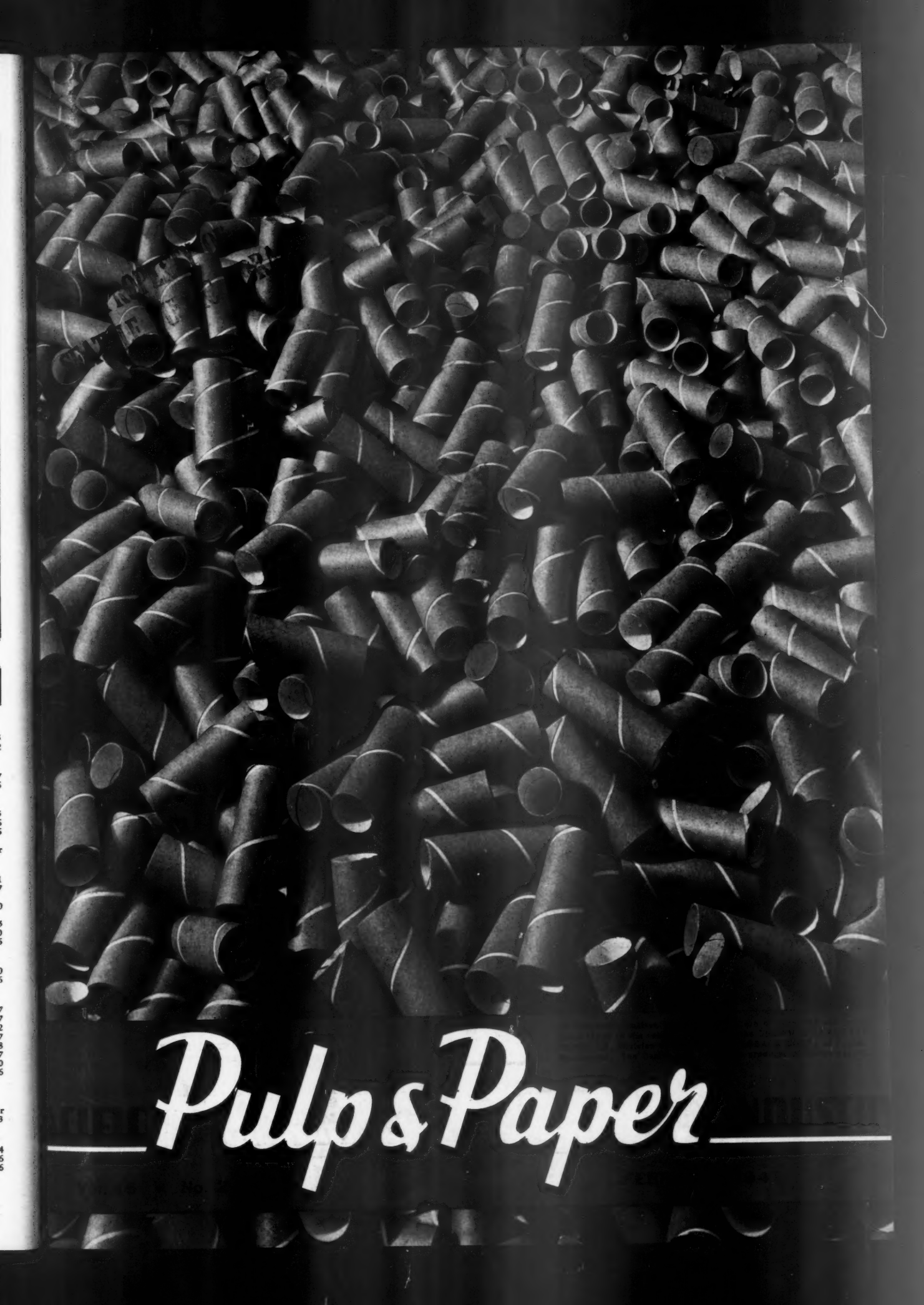
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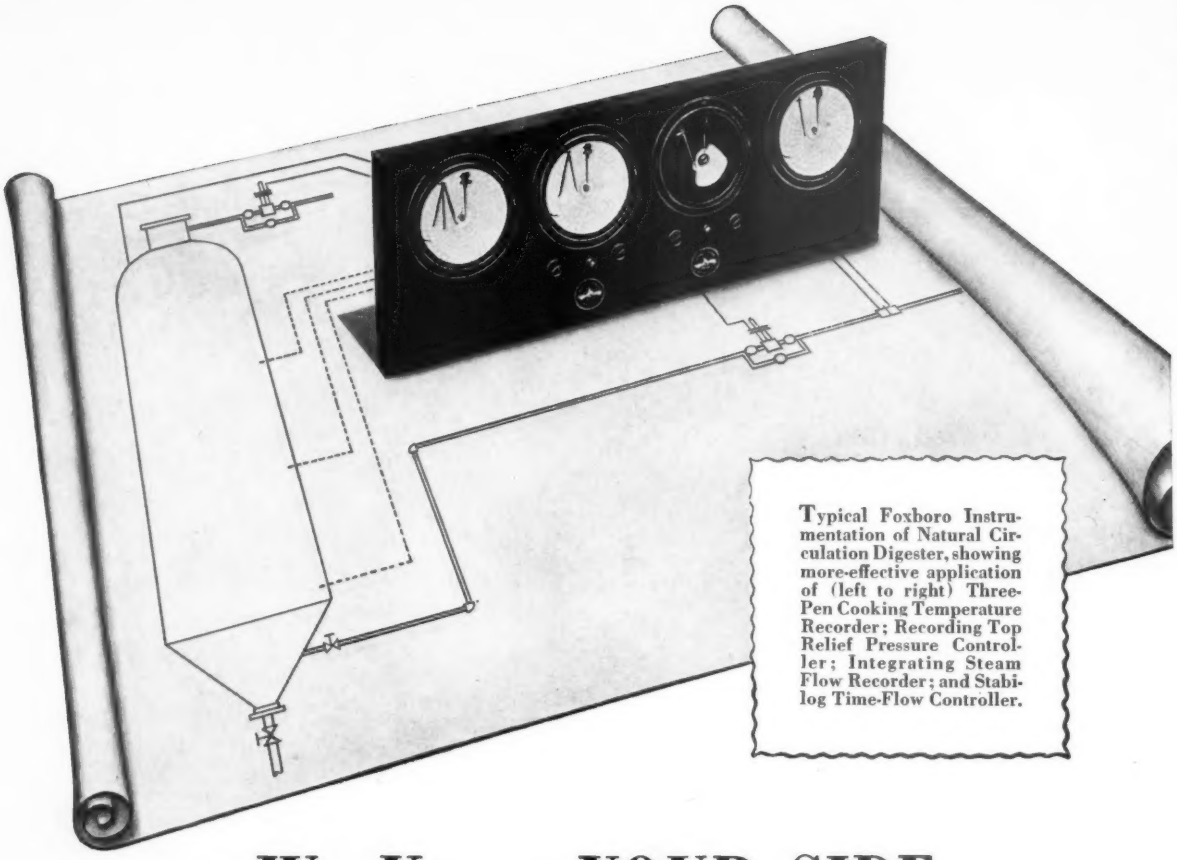

Typical Foxboro Instrumentation of Natural Circulation Digester, showing more-effective application of (left to right) Three-Pen Cooking Temperature Recorder; Recording Top Relief Pressure Controller; Integrating Steam Flow Recorder; and Stabilog Time-Flow Controller.

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Sweden Certain U. S. Pulp Trade to Revive After the War

"The economic forces, which will be exceedingly strong once the freedom of communications is regained, will assuredly lead to the resumption of trade," says The Swedish Wood Pulp Journal.

THE December 15th issue of The Swedish Wood Pulp Journal which arrived in the United States early in February, had the following to say regarding exportation of Scandinavian wood pulp at the end of the war.

"Overseas trade papers, especially in America, have been discussing the consequences of "a new order in Europe" fairly freely, and it is prophesied—especially in circles expecting to benefit from such development—that the part played by Scandinavia as a supplier of pulp to the rest of the world will now come to an end. These arguments hardly need to be met from here. Suffice it to say that the organic bond between the Scandinavian pulp industries and the pulp buying industries of the consuming countries —also oversea—cannot be broken for all eternity by the present blockade, which cannot last forever. The old connections will necessarily be resumed as soon as the blockade is lifted. The three Scandinavian countries, Sweden, Norway and Finland, represent between them so large a proportion of the world's pulp supplies that a substitute for their shares cannot be found at a moments notice. The economic forces, which will be exceedingly strong once the freedom of communications is regained, will assuredly lead to the resumption of trade. That this recovery may be both troublesome and slow—in direct proportion to the length of the present war and blockade — is another matter."

As the writer of the above did not name specific articles or trade papers his references cannot be determined with exactness. However, "a new order in Europe," in connection with wood pulp, probably refers to the formation of a new European wood pulp cartel last August whose headquarters are in Berlin instead of in Stockholm where pre-war cartel control was centered. The organization of the new cartel was reported by the American Commercial Attache in Stockholm. The report, together with this journal's comments, was published in the October, 1940, number of PACIFIC PULP & PAPER INDUSTRY under the heading "Headquarters at Berlin," and is reprinted below for consideration alongside the quoted statement from The Swedish Wood Pulp Journal.

The October Article

● At the end of the wood pulp report cabled by the American Commercial Attache in Stockholm, September 18th, was the sentence, "Cartel headquarters will be at Berlin."

Those in the American pulp and paper industry who had been expecting imports of wood pulp from Sweden, Finland and Norway to be resumed upon the old basis when the war in Europe is over, were brought up with a jerk. The good old days may not return. The present dependence upon North American sources of wood pulp may become permanent.

The report:

● "A rigid control of all major phases of operations in the European wood pulp industry is contemplated by the wood pulp cartel, according to a report from the Office of the American Commercial Attache, Stockholm, received by the Forest Products Division, Department of Commerce.

"Final details are not available but it is contemplated that there will be a rigid control of production, according to the report. Exports of each country and every mill will be on quota basis, with prices fixed by committees of representatives of each exporting country. Determination of prices to each export market for every type of pulp will be by vote. The number of votes to which each exporting country is entitled will be decided on every type of pulp for each export market by the tonnage of past exports. On the basis of exports to the United States, 1929 to 1939, inclusive, Sweden will have approximately the following percentage of votes on the types of pulp indicated: Unbleached sulphite, 64.3 per cent; bleached sulphite, 31 per cent; unbleached sulphate, 80 per cent; and bleached sulphate, 83.9 per cent. Germany and Norway and all others except Finland hold 54 per cent of the votes on bleached sulphite. Cartel headquarters will be at Berlin."

A later report from Stockholm said: "An agreement has been reached regarding the allotments for shipments of wood pulp by the European wood pulp cartel to Belgium and the Netherlands for the last 4 months of 1940. The headquarters of the cartel are to be in Berlin.

"Under the terms of the agreement,

the Netherlands will be supplied with approximately 12,000 tons of sulphite pulp for the remainder of this year. One-third will be supplied by Sweden, one-third by Germany and the remainder by all other cartel members. Of the 18,000 tons of sulphite, which it is estimated that Belgium will require, one-third will be supplied by Sweden, one-third by Germany, and the remainder by all other cartel members.

"Both the Netherlands and Belgium will take 11,000 tons of sulphite wood pulp, 5,000 tons to be supplied by Sweden, 3,000 tons by Germany and the balance by all other countries. No decision has been made concerning the amount which Italy or France will receive for the remainder of the year, but it was stated that wood pulp prices for Italy would be approximately the same as in previous countries. According to the latest information, Sweden will receive the same price for its wood pulp as she does under existing contracts. Details concerning payments through German clearing are still under discussion."

These reports caused speculation as to how democratic the cartel will actually be in practice. The organization apparently gives wide latitude to the representatives of the industry in each country, but this democratic form may be nothing more than a front to hide German domination of the pulp industry of Sweden, Norway and Finland. The freedom of choice reported to be allowed these three pulp producing countries under the cartel agreement is made doubtful by the statement that the cartel headquarters will be at Berlin.

At present with the cork still in the neck of the Baltic bottle, Sweden, Finland and Norway are completely under the commercial domination of Germany. They are reported to be rapidly adjusting their economies to carry on a major portion of their export and import trade with Germany, first, and Russia, second. It is also reported that Germany, in buying lumber, pulpwood, wood pulp and paper from the three countries, has dictated prices much lower than those in effect prior to the war.

With Sweden, Finland and Norway at the economic mercy of Germany and in view of Germany's announced intention to dominate the economics of Europe, at least of Continental Europe, it is not to be expected that the pulp exporting countries will vote for prices or for quotas not approved by Berlin.

With but a slight trickling of pulp from Finland via Petsamo, the problem is temporarily academic, but at any time it may become of major importance to American buyers and sellers of pulp. Should Germany win the war or should the war become a stalemate with Germany in control of the Continent and the British blockade broken, the German domination of the pulp producing countries will vitally affect the industry in this country. In case Britain wins, the Scandinavian countries and Finland may return to the old basis of a voluntary European pulp cartel largely dominated by Swedish producers.

For the purpose of speculative analysis let us assume that Sweden, Finland and Norway are free at some future date to export pulp to the United States upon the basis outlined in the foregoing reports from Stockholm.

Will they offer their pulp at very low or very high prices? It is generally conceded that prices would be high for a time due to shipping costs which are expected to remain at present high levels because of the tonnage sunk and the danger of floating mines. It is also expected that wood and production costs in northern countries will be high for some time after full production is again attained. Another reason advanced is that the European producers will be forced to sell to Germany at little or no profit, if not at a loss, and they will endeavor to average out by charging American paper mills all the market will stand.

The condition of the American paper industry would have much to do with the prices of foreign pulp. If the American mills were busy the price would be high but if the production ratio dropped down into the seventies or lower the price would come down below the cost of producing American pulp as it has done in the past. It would not come down immediately if costs remained high in Sweden, Norway and Finland, but it would be low as soon as they could drop it for those countries will be, if and when they are free to export, desperate for dollar exchange.

If the American paper mills were getting along pretty well with domestic and Canadian pulp, there would be no tendency to buy overseas pulp at high prices. If they were badly in need of pulp or the prices were lower than for North American pulp there would be the temptation to purchase from the German dominated countries.

Unless this country does the unexpected and changes its attitude toward Germany, the buying of pulp from sources that would indirectly benefit that country would be a highly unpopular procedure, and it might easily be considered unpatriotic if the American attitude toward Germany becomes more actively antagonistic. Those who bought might even be boycotted.

If this should become the attitude of the American people the government might consider pulp from Sweden, Finland and Norway as being of German origin and slap on a prohibitive tariff.

The precarious situation in which we find ourselves in the case of tin and rubber should be sufficient warning that the only safe course to follow is to develop adequate sources of raw materials within our own borders if at all possible. It is not only possible in the case of wood pulp but necessary as a measure of national defense against the loss of foreign supply sources and as protection against Nazi domination of our pulp and paper industry.

Self-sufficiency in wood pulp is today more than ever a common sense objective for the American pulp and paper industry.

That Fulmer Bill Is Here Again

● Representative Fulmer of South Carolina is back again with his bill to force the use of cotton in the manufacture of paper and paperboard. Introduced in previous sessions of Congress the bill has made little progress but this time the story may be different. The American Paper & Pulp Association summarizes the Fulmer Bill's provisions for pulp and paper manufacturers as follows:

"Under the guise of a processing tax Congressman Fulmer of South Carolina has introduced a bill to compel the use of cotton in cellulose pulp. This bill, designated H.R. 99, is an adaptation of a similar bill introduced during the last session. It is designed to improve the position of the Southern cotton grower and undoubtedly will have substantial support from the Southern Congressional delegation. The bill has been referred to the House Committee on Agriculture of which Mr. Fulmer is chairman.

The bill provides that the Secretary of Agriculture shall acquire, at market price, "in excess of five million bales" of surplus cotton, to be designated "pulping surplus cotton." This surplus cotton is to be available to pulp processors at prices ranging from 6 cents to 7 cent per pound ($120 to $140 per ton), depending on length of fibre. In the case of paperboard manufacturers using two-thirds waste or reclaimed paper in their furnish a discount of 33 1/3 per cent is provided. Pulping surplus cotton "already pulped," it is provided, shall be procurable at 7¼ cents per pound ($145 per ton).

"The bill imposes a tax on the first processing of cellulose pulp, whether domestic or imported. The rate of tax varies with the value of the pulp as follows:

Pulp valued at $5 or less—50 per cent.
Pulp valued at $5 to $119 per ton—50 per cent of such value minus 1/3 of 1 per cent for each dollar by which such value exceeds $5 per ton, and fraction of a dollar in proportion.
Pulp valued at more than $119 per ton—12 per cent.
Provision is made in the bill for a compensating import tax.

"It is then provided that the taxes imposed shall not be applicable to processors whose pulp includes 'the following content by net weight of new spinnable raw cotton, grown in the United States, of a grade not lower than number one cotton linters, as defined under the United States Cotton Standards Act; and/or pulped, chopped, mashed or ground fibre derived therefrom':

1. Pulp valued at $53 or less per ton —5 per cent cotton; provided that in board containing in excess of 2/3 waste or reclaimed stock, the use of 3.33 per cent will qualify the product for exemption.
2. Pulp valued at over $53 and not over $72 per ton—10 per cent or more of cotton.
3. Pulp valued at over $73 per ton—15 per cent or more of cotton.

"The following operations are specifically exempted from the tax, irrespective of cotton content:

1. The processing or import of floor or roofing felt.
2. The processing or import of any commodity for charitable uses.
3. The processing or import of certain commodities in which the value of the pulp is less than the value of some other single component.
4. The processing and import of "paperboard" and like products having an invoice value in excess of ten times the value of the basic pulp content.

5. The processing or import of any cellulose commodity, product or article not specifically provided for, having an invoice value in excess of fifteen times the value of the basic pulp content used in the first domestic process.

"The basic provisions of the bill are outlined above. Other procedural sections deal with the manner in which the taxes shall be collected, information returns, penalties, refunds, the promulgation of rules and regulations, and the treatment of existing contracts."

● At the time Representative Fulmer introduced a similar bill in 1939, it was estimated that the additional cost of converting the raw cotton into suitable pulp form would amount to 3 cent per pound. In his 1941 edition Mr. Fulmer provides that, pulping surplus cotton "already pulped," shall be procurable at 7¼ cents per pound. It is not indicated from whom the cotton pulp may be obtained at this price.

If the Fulmer Bill becomes the law, the consumers of paper and paperboard will surely pay far higher prices, not only because of the higher cost of cotton but also because of the enormous extra record keeping which will be required of the mills.

Representative Fulmer's proposal is obviously impractical and uneconomic. It is totalitarian in its intent: the forced use by industry of an uneconomic raw material.

He puts the cart before the horse. Because a surplus of cotton is grown in the South, he proposes to force its unnatural use by industry. Instead of attempting to remedy the cause Representative Fulmer plans to adjust the effect of too much cotton on the growers by shifting the loss to a particular industry.

Since wood is far cheaper than cotton in papermaking, a partial horse-before-the-cart solution would be the reduction of cotton acreage and the substitution of southern pine acreage.

In the foregoing summary of the Fulmer Bill by the American Paper & Pulp Association, no specific reference is made to the use of pulp for rayon but rayon as well as paper and board would likely be adversely affected for the tax applies to the first processing of cellulose pulps. Exempted from the tax is the processing or importation of any cellulose commodity, product, or article not specifically provided for, having an invoice value in excess of fifteen times the value of the basic pulp content used in the first domestic process.

This clause would not exempt viscose rayon for the selling price is not more than five times the cost of the wood pulp.

In Representative Fulmer's "Cotton Pulp Consumption Act," introduced early in 1939, rayon, cellophane and plastics not containing cotton, were to be taxed 15 per cent of their value.

The Rayon Organon said in its issue of May, 1939, "This is another attempt to solve the cotton dilemma by punitive taxes on competing products."

As Mr. Fulmer is chairman of the House Committee on Agriculture and his bill has been referred to that committee, it is expected that he will make every effort to have the committee report it favorably to the House of Representatives. If hearings are held the pulp and paper industry will appear in opposition, or if the bill is reported favorably without hearings, the industry will vigorously oppose the measure on the floor.

Coast Men Give Papers At TAPPI New York Meeting

● Two papers are to be presented at the annual meeting of TAPPI at the Hotel Roosevelt in New York City, February 17-20th inclusive, by Pacific Coast pulp and paper mill men.

N. W. Coster, past chairman of the Pacific Section of TAPPI and technical director of the Soundview Pulp Company, Everett, Washington, will present a paper prepared by himself and R. I. Thieme of Soundview's technical department, on "Some Observations Regarding Chlorination of Sulphite Pulp." This paper will be given as part of the Symposium on Chlorination of Wood Pulps at 9:30 a. m. February 19th.

A paper by Walter F. Holzer of the Central Technical Department of the Crown Zellerbach Corporation, Camas, Washington, on "Some Effects of Heartwood Decay in Western Hemlock on Sulphite Pulp Therefrom," will be presented at the Acid Pulping Meeting at 9:30 a. m. on Tuesday, February 18th.

Among the Pacific Coast men who will attend in addition to Mr. Coster, are: W. R. Barber, technical director, Crown Zellerbach Corporation, Camas; and Fred A. Olmsted, technical supervisor, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, and chairman of the Pacific Section of TAPPI.

● Three Weyerhaeuser men are expected to be at the meeting, Robert B. Wolf, manager of the Pulp Division; W. Norman Kelly, manager, Longview Mill, Pulp Division; and, R. S. Hatch, research director, Weyerhaeuser Timber Company.

Petrie and Logan in New Jobs at Ocean Falls

● James Petrie has been appointed assistant to the resident manager, Frank R. Drumb, of Pacific Mills, Limited, Ocean Falls, B. C. He was formerly technical supervisor.

Succeeding Mr. Petrie as technical supervisor is K. G. Logan.

Ackley Named Superintendent At Lebanon Mill

● The first of February Charles E. Ackley became mill superintendent of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Lebanon, Oregon. He came directly from the Hawley Pulp & Paper Company, Oregon City, Oregon, where he has been general superintendent for the past three and one-half years.

Mr. Ackley's first job in the pulp and paper industry was with the Crown-Columbia Pulp & Paper Company at Camas, Washington, in 1910. He stayed in Camas nine years working up to machine tender. In 1919 he left Camas to become machine tender for Consolidated Water Power & Paper Company at Stevens Point, Wisconsin, and continued in this capacity until the spring of 1921, when he went with Continental Paper & Bag Corporation at Marinette, Wisconsin. At this plant he had charge of starting up two new MG machines.

Four years after going to Marinette, Mr. Ackley became associated with the Kalamazoo Vegetable Parchment Company at Kalamazoo as machine room foreman. He remained there 15 months before returning to the Pacific Coast to work for the Oregon Pulp & Paper Company at Salem, Oregon, as night boss. He left Salem in the fall of 1928 to take charge of starting up the pulp drying machine at the Grays Harbor Pulp & Paper Company, Hoquiam, Washington (now Rayonier Incorporated). Mr. Ackley had charge here for about a year, then moved into the Grays Harbor paper mill as boss machine tender, where he remained until March, 1937. At that time he joined the Hawley Pulp & Paper Company as general superintendent, leaving January 1st to assume his new position at Lebanon.

Paul F. Middlebrook is resident manager of the sulphite pulp and paper mill of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Lebanon, Oregon.

CHARLES E. ACKLEY, Mill Superintendent at Lebanon, Oregon.

Rayonier Awards Service Pins At Port Angeles Dinner

MORE than 300 of the 509 regular employees of Rayonier Incorporated, Port Angeles Division, now possess 5 or 10-year service pins, Resident Manager Arthur W. Berggren announced when the company presented pins to 150 men and one woman at a dinner in Port Angeles January 29th.

This high proportion of employees holding 5 and 10-year service pins becomes even more impressive when it is recalled that the pulp mill began operations on June 9, 1930, less than eleven years ago, and with fewer employees, for the rated capacity was 175 tons daily as compared with 250 tons at the present time.

W. Lloyd Raymond, vice-president of Rayonier Incorporated, made the presentations at the dinner, assisted by S. W. Grimes and M. R. Cashman, personnel and safety supervisors of the Port Angeles Division.

Some 200 Rayonier employees, officials and special guests, including several Port Angeles community leaders, attended the event. Mayor H. H. Beetle voiced congratulations and greetings from the city of Port Angeles to the service pin recipients.

Some "ancient history" was brought to light by Toastmaster William D. Welsh in calling on Charles H. Conrad, secretary-treasurer of Rayonier, for brief remarks. Both are former Port Angeles men now located at San Francisco, where Mr. Welsh is on the Rayonier and Crown Zellerbach staffs.

The toastmaster told how on the day the United States declared war in 1917 a telegraph messenger boy brought a press bulletin on the declaration to the Port Angeles newspaper office where Welsh was city editor. The messenger boy, he disclosed, was "Chuck" Conrad. Mr. Conrad responded with similar reminiscences and pointed out the names of several old school mates and neighbors in the list of men receiving service pins that night.

"Significance of Our Service Pins" was the subject of the address of the evening, given by Alexander R. Heron, director of industrial relations for Rayonier Incorporated.

Mr. Heron stressed the thought that "the books are not closed" between employer and employee in industry when the worker finishes his day's labor and receives his paycheck. The employee, he stressed, has invested something far greater than labor in his job—he has invested the five, ten or fifteen years of his life that he has spent in the plant. In return, Mr. Heron said, he wants assurance that the industry will continue operating and still provide him a job in future years.

He wants a management that is conducting research and developing new products to replace those of the present if they become obsolete, Mr. Heron said, a management that is making sure of raw materials in years to come, that is keeping up its reputation by delivering a constantly good product and friendly relations with customer and public, that is maintaining its physical plant and looking ahead to future needs, and is fair to its employees. These things, the speaker declared, are being done by the West Coast pulp and paper industry.

In return, he said, the workman is willing to pay certain things besides his labor. One of the most important steps he can take, Mr. Heron observed, is to give the newcomer alongside him in the plant

The only lady to receive a Service Pin at the Rayonier dinner was Miss BETTY M. SIMPSON / / / Standing at her left is W. LLOYD RAYMOND, Vice President of Rayonier Incorporated, who made the presentation / / / At the Speakers' Table, left to right, RAYMOND DUPUIS, Resident Manager, Washington Pulp & Paper Corp., Division of Crown Zellerbach Corp.; A. R. HERON, Director of Public and Industrial Relations, Rayonier Incorporated, who gave the address of the evening; WILLIAM D. WELSH, Executive Offices, San Francisco, who served as toastmaster; ARTHUR W. BERGGREN, Resident Manager, Rayonier Incorporated, Port Angeles Division; CHARLES H. CONRAD, Secretary-Treasurer, Rayonier Incorporated; ROBERT E. BUNDY, Resident Manager, Fibreboard Products Inc., Port Angeles; and ARTHUR BLAIR, President, Port Angeles Local 155, International Brotherhood of Pulp, Sulphite & Paper Mill Workers / / / Mayor H. H. Beetle of Port Angeles is standing behind Mr. Conrad.

the understanding that future of the industry depends on him and the kind of job he turns in, and that the industry wants him to become a permanent, cooperating part of it.

Concluding the program, Merle F. Savage, a Rayonier mill employee, sang the opening lines of "God Bless America" and led the assemblage in community singing of the chorus.

Special guests introduced included F. R. Pearson, office manager of the Shelton Division of Rayonier Incorporated.

Rayonier Service Pin Awards

10 Years

• Manuel W. Almaden, Ernest W. Andrus, Axel Arvidson, Charles Atkinson, Clarence Baker, William J. Baker, Domenick Basegio, Foster M. Beal, John E. Bland, Paul Blatter, Paul M. Brown, Melvin A. Burdick.

Frank N. Capps, P. Cannon, Claude M. Case, M. R. Cashman, Arthur A. Castellarin, Harry J. Cathcart, Earl E. Conaway, Raymond E. Crain, James P. Crocker, James L. Culley, George Day, Karl Day.

Fred J. Diamond, Donovan Dole, Samuel J. Dustman, Lawrence R. Earl, Kenneth Erickson, William J. Faulkner, Alexander Ferrie, Sidney R. Fint, Earl Flora, Harold T. Fretz, Chester Fuller.

Felix Gallacci, Lamond C. Galland, William Edgar Gaul, F. Gordon, Raymond C. Gormley, S. W. Grimes, Roy W. Gustafson, Thomas C. Goin, John Heilman, Walter Henry, Eugene D. Hervin, Morris Hodgdon, Owen Huffman, H. Huggins.

Calvin J. Hunt, Roy C. Hutchinson, Eric Ewald Johnson, Stanley N. Johnson, Gordon L. Johnston, George Keller. John Kennedy, Roy R. Kingsley, Peter C. Larsen, H. H. Lawson, Arthur Lloyd, Merwin Lloyd.

Arthur L. Lockhart, John Lopthien, Thomas Victor Lopthien, Howard Maddux, George Main, Merton Mathewson, James Dewey McDonald, D. J. McFayden, Earl McLane, Albert Mills, Guy Montgomery, J. H.. Morrey, Frank Morris, Eben C. Mounce, C. T. Mulledy, Steve Nastiuk.

William Neuman, Alfred Nichols, Percy Oakes, John G. Olson, William Padgham, Dan Patterson, John A. Pennington, Theodore Peterson, Fred Pinyerd, Fred F. Plantz, Frank S. Pollak, Jr., Elmer Pollock, Harry E. Powless, Charles Pringle, Henry Race, Louis Rickard.

Charles B. Roberts, John R. Roddy, Frank Rogers, Joe Ross, Waino Saari, Anthony L. Sanford, Merle F. Savage, Allen Sawby, H. A. Searles, Ellis J. Sheley, Betty M. Simpson, George Sinclair, Sr., Harry Smelling, Joseph Sparks.

H. A. Sprague, H. C. Springer, Toni Stefani, Christian M. Steike, Clarence Sturdevant, Robert N. Sutherland, Ernest Theriault, Frank Todd, Mathew Trickey, Floyd Vernon, Abe Virginia, Ernest Virginia, Fred Walker, Harold H. Walker, George Whitehall, Chester L. Wilson, Clifford R. Winston, Hallard Wournell, Hiram Wright.

5 Years

• Gerald Bena, James P. Bogie, Arley M. Boyd, Julius H. Bronner, James R. Conrad, Jack, Del Guzzi, Conrad Dyar, Kenneth E. Harris, Harold W. Hart, Jack E. Howell, Robert G. Johnson, Budd Kirk, George Lattrell.

Dewey D. Landru, James H. Middleton, Oscar Moorhead, John A. Mosolf, Harry S. Nastiuk, Frank A. Newberry, Clayton Peters, Kenneth A. Peterson, Ray H. Petersen, Murray F. Randall, Albert Reagin.

W. H. Riggs, Alfred Ross, H. A. Ruud, Walter T. Scrase, Burton K. Shryock, Earl D. Stout, L. R. Stover, Carl W. Wicklander.

Guest Members of Rayonier 10-Year Service Club

• Wm. J. Benson, A. W. Berggren, Oliver Conrad, Ferman Derrey, Wm. P. Ditz, J. C. Fey, Frank P. Fisher, Jr., Paul Fletcher, Otto Frame, J. G. Hardy, W. J. Lowndes, C. A. Ogrosky, Chas. E. Rittenhouse, Peter Tveit, H. E. Weller.

Claude Christiansen Joins St. Regis

• Claude B. Christiansen, kraft mill chemist of the technical department, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, became assistant chemist at St. Regis Paper Company, Kraft Pulp Division, Tacoma, the middle of February.

Mr. Christiansen has been with the Camas mill since receiving a degree in chemical engineering from Oregon State College five years ago.

Famous Ellis Wood Visits Port Angeles

• Former fellow-workers at the Port Angeles Fibreboard Products mill recently enjoyed a visit from Ellis Wood, who won nationwide note a few months ago as one of the captors of Kidnaper Wilhelm Muhlenbroich in the California mountains.

Wood formerly worked at the Port Angeles mill but went to California last year and took a log truck driving job with Cecil Wetzel, with whom he captured Muhlenbroich. When he called on his old working mates he was enroute to New York with his wife and five children on a vacation trip, financed by a part of the reward he received from Count Marc de Tristan, father of the kidnaped child rescued by Wood and Wetsel.

Victor Hughes Heads Drive in Bellingham

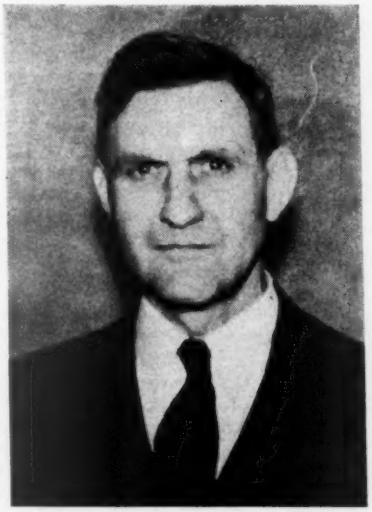
• Heading the drive for funds for the Salvation Army in the Bellingham district is Victor A. Hughes, secretary of the Pacific Coast Paper Mills. Upon accepting the appointment, Mr. Hughes said: "This is a project on which all of us can get together, regardless of race or creed, for the Salvation Army represents those principles of elemental human kindness that draw no lines. The spirit of cooperation embodied in the resolution of support by the Central Labor Council presents a united front on the part of men and women who work at the benches, counters, desks and machines in Bellingham."

Austin Nickels Named Hawley Superintendent

• In line with the policy of promotion from the ranks whenever possible, Carl E. Braun, vice president and mill manager, Hawley Pulp and Paper Company, Oregon City, Oregon, announced the appointment of Austin Nickels to the position of general superintendent of mill operations, effective January 9th.

Mr. Nickels has devoted 36 years to the paper industry in the vicinity of Oregon City, having started in 1905 at the old Willamette Paper Company, across the river at West Linn. In 1910 Nickels entered the employment of the Hawley Pulp and Paper Company and has been with the company continuously since. In 1926 he was appointed boss machine tender, the position he held until recently promoted to general superintendent.

Mr. Nickels brings to his present position 31 years of active and devoted service to the Hawley company and an extensive knowledge of the fundamentals of pulp and paper making.



AUSTIN NICKELS, General Superintendent, Hawley Pulp & Paper Co.

The Vortrap As a Means of Removing Dirt From Bleached and Unbleached Sulphite Pulp

by L. E. STEVENSON*

ABSTRACT

● ***The Vortrap has been installed so that the efficiency of this unit in removing foreign material from pulp could be evaluated in comparison with the present rifflers. Studies on Bleached book and standard pulp show that the Vortrap when operated normally, with no "bleed," does not compare favorably to the rifflers. With at least a 1.0% "bleed-off" of pulp and dirt, the efficiency in removing inorganic material is as good or better than that of the rifflers. Dirt removal at 0.5% consistency is greater than at higher consistencies, but not enough greater to warrant the use of the additional Vortraps which would be necessary. Operation at 270 gallons per minute and 1.0% consistency (not the most efficient conditions) is at least twice as efficient in removing dirt as are the rifflers. Operation on unbleached stock showed no improvement over our present unbleached rifflers and screens.***

ANY mechanism designed to replace the rifflers and/or the screens for removing foreign material from pulp must be simple, easily operated, and efficient in removing a small amount of material from a large volume of pulp. Objectionable material in unbleached pulp consists of bark, shives, pitch, carbon, stained fiber, etc. Much of this material has a specific gravity nearly the same as the pulp fibers. Objectionable material in bleached pulp consists of not only organic material but also substances of an inorganic nature such as sand, grit, scale, etc., which is commonly referred to as process dirt.

The Vortrap has been operated for several years and its operation reported upon at various times. Freeman[1] states that when Vortraps were installed on a news machine, the Vortraps proved more effective than rifflers, removing one pound of dirt per ton of newsprint. One third of this material was inorganic. In another instance on kraft pulp, Freeman[1] states that 93 per cent of all material heavier than the pulp was removed, provided such material was larger than colloidal size.

Description of Apparatus

● The Vortrap has been adequately described by the manufacturers[2,3] as follows:

"Essentially, the Vortrap consists of a long cylindrical pipe within which a pulp suspension is made to revolve rapidly. The swirl is produced by forcing the suspension under pressure into the top of the cylinder, through a tapered tangential inlet. It then travels downwards at high velocity along a helical path, until it reaches the closed bottom. Here it reverses upon itself to return along the central axis to the outlet which is located near the top of the cylinder but below the tangential inlet, and facing away from it."

"The cylinder is provided near its middle with a rubber diaphragm having a central aperture, and it is also provided at its lower extremity with a diaphragm having a central aperture and one or more apertures next the inside wall of the cylinder. Below the bottom diaphragm is a funnel-shaped end piece connected by piping to a suitable container for the separated dirt. The upper diaphragm serves to deflect the suspension and the dirt towards the center, but before reaching the inner helical region where it would be carried up towards the outlet, it passes through the central aperture, carrying downwards into the region below. Although the swirl is somewhat diminished, there is still an appreciable centrifugal force in operation when the suspension reaches the lower diaphragm. This diaphragm allows the escape of dirt from the Vortrap through the cone and outlet piping into the waste receiver."

The Vortrap was originally designed so that operation was limited to a single pass through one Vortrap. Additional work by the manufacturers[2] has disclosed that benefits may be derived from the process of "bleeding-off." In this procedure a small percentage of the rejected material (from 1 to 10 per cent) is "bled" away from the dirt receiver, diluted, and passed through a secondary Vortrap. When operating with a "bleed-off" to a secondary Vortrap, not only are the heavy particles removed but also light inorganic and organic material which would ordinarily pass through a single Vortrap is removed. With this installation, the secondary Vortrap is operated at lower consistencies which tends toward greater efficiency.

The Vortrap was installed for our experimental installation so that either bleached or unbleached sulphite stock could be passed to the Vortrap at any desired rate up to 300 gallons per minute and any consistency up to 1.5 per cent. The 4-inch diameter Vortrap itself consisted of two sections, one 30-inch section and one 12-inch section. The central diaphragm was provided with two apertures, one circular in the center and one oblong aperture in the periphery to allow dirt to fall through. The bottom diaphragm was provided with two circular apertures, one in the center and one in the periphery.

L. E. STEVENSON, Gave results of experiments with the Vortrap on bleached and unbleached sulphite pulp.

*Technical Department, Longview Mill, Pulp Division, Weyerhaeuser Timber Company, Longview, Washington. Presented in competition for the Shibley Award at the dinner meeting sponsored by the Pacific Section of TAPPI, Tacoma, Washington, February 4, 1941.

The bleached rifflers to which the Vortrap was compared, consisted of 8 sections each 8 feet 9 inches wide and 82 feet long. Five 12-inch baffles are located at the head end of each riffler and are pointed at an angle of 50° with the stream. The floor of each riffler is covered with a long nap cotton felt. The surface velocity of each riffler is 70 feet per minute. The consistency of stock passing over the rifflers is 0.5 per cent. The unbleached rifflers are much the same as the bleached rifflers except that the surface velocity is 90 feet per minute and the consistency is 0.4 per cent.

Experimental Procedures

● Procedure for collecting the dirt from the riffler was as follows: One riffler was shut down flushed, hosed, scraped, and put in service for 24 hours. At the end of that period the riffler was again shut down, flushed, and the entire amount of rejects collected in a large box constructed with a bottom of fourdrinier wire covered with cloth sheeting. After draining, the contents were measured and a representative sample was dried, weighed, and ashed.

Procedure for collecting the dirt from the Vortrap was as follows: After the Vortrap had been in service for an adequate period to stabilize conditions as to rate of flow, consistency, bleed to the secondary and final rejects bleed, samples of the rejected material were taken at periodic intervals for 24 hours. These rejects were dried, weighed, and ashed.

In both riffler and Vortrap rejects, only the ash contents have been recorded as this is the only factor which can actually be used for comparisons on bleached pulp. The ash was corrected for the ash of the pulp itself. Unashed, bleached riffler rejects contained too much pulp fiber and fines to be of any value in comparative work.

Hand sheets were prepared of the bleached accepted Vortrap and riffler stock in order to make comparative dirt counts. However, it was found that it was not possible to prevent contamination of the pulp with the equipment on hand so that the results were very erratic.

Because of the organic nature of the unbleached foreign material, it was impossible to obtain ash contents of the rejected material. Therefore, hand sheets of the accepted material were made up for comparative purposes. The dirt counts were so large in this case that contamination caused no trouble.

Presentation of Data

● The project may be divided into two main divisions (I) bleached pulp and (II) unbleached pulp.

I. The Problem on Bleached Pulp May Be Stated as Follows:

● To compare the Vortrap efficiency with the bleached riffler efficiency in removing foreign material from bleached pulp.

A. Series of Experiments with No "Bleed-off" From the Vortrap.

The results of this series of experiments are recorded in Table I.

In this series, the Vortrap in no case compared favorably to the rifflers. Material of an organic nature was not found in the rejects of either the rifflers or the Vortrap.

B. Series of Experiments with "Bleed-off."

The results of this series of experiments are recorded in Table II.

In all cases where 0.7% or more of the total stock processed was "bled-off" the amount of inorganic material removed by the Vortrap exceeded the amount removed by the riffler. With greater amounts of "bleed" the efficiency was increased.

C. Series of Experiments Comparing Operations at 1.0% to Operation at 0.5% Consistency With "Bleed."

● Operation of the Vortrap has generally been at 0.5% consistency. However, most of the published work has been performed on paper-making stock just before it goes to the machine. Such stock is usually well hydrated or "slow" and is quite different from a "free" unbeaten sulphite pulp. Paper-making stock, therefore, must be used at low consistencies (0.5 or less) in the Vortrap to give good results. Comparison of a low consistency (0.5%) to 1.0%

Table I

Gms. Inorganic Material Removed by Riffler per 24 Hrs.	Gms. Inorganic Material Removed by Vortrap per 24 Hrs.	A. D. Tons Treated by Vortrap per 24 Hrs.	Speed Through Vortrap (Gals./Min.)	Consis.
764	364	12.0	200	1.0
764	272	12.0	200	1.0
764	382	16.2	270	1.0
764	418	12.0	200	1.0
764	473	10.8	200	0.9
764	300	18.0	200	1.5
764	360	12.0	200	1.0
764	328	12.0	200	1.0

Grams material based on 200 A. D. Tons per 24 Hours.
STANDARD Stock.

Table II

Grams Inorganic Material from Riffler	Grams Inorganic Material from Vortrap with "Bleed"	% Material "Bled"	% Consistency	Speed GPM's	A.D. Tons
764	510	0.04%	1.0%	200	12
764	1,585	0.72%	1.0%	200	12
764	1,420	5.55%	1.0%	200	12
764	2,610	5.25%	1.0%	200	12

Grams material based on 200 A. D. Tons per 24 Hours.
STANDARD Stock.

Mr. Stevenson emphasized that the data presented on the relative efficiency of the Vortrap versus the riffler resulted from experiments with the standard book and bond types of bleached and unbleached sulphite pulp produced by the Longview Mill, Pulp Division, Weyerhaeuser Timber Company. Similar tests on the same types of pulp in other mills might show entirely different results due to the variables involved.

The pulps tested were neither beaten nor jordaned. Hence the data presented does not apply to sulphite pulps prepared for the paper machine.

consistency on pulp stock is recorded in Table III.

It will be noted that there are advantages to be gained at the lower consistencies. In most cases more inorganic material is removed, as well as some organic material. The advantages, however, might be offset by the number of Vortraps necessary at the lower consistencies.

D. Series of Experiments Operating at Higher Speeds With "Bleed."

● Previous initial experiments had indicated that the Vortrap might perform as efficiently at higher speeds as at lower. To prove this, the Vortrap was operated at 270 gallons per minute and at 0.75% consistency. The results of these experiments appear in Table IV.

In most cases operation at lower consistencies and higher speeds indicates that the removal of inorganic materials is essentially the same as when operating at 200 gallons per minute and 1.0% consistency. The efficiency when operated at 270 gallons per minute and 1.0% consistency is lower than in other cases, but is at least 50% better in dirt removal than the riffler.

II. The Problem on Unbleached Pulp May Be Stated As Follows:

● To compare the Vortrap efficiency with the unbleached riffler and screens efficiency.

Unbleached pulp dirt analysis indicates that the majority of dirt encountered is organic in nature and, therefore, cannot be analyzed by ash contents. The dirt count method was employed as a measure of the amount of material removed. Pulp, before and after the Vortrap, was sampled and made into 12x12 hand sheets of approximately 250-lb. basis weight. Wet dirt counts were obtained on all sheets and reported as specks per pound per ream.

In the case of unbleached pulp, the Vortrap was frequently plugged because of large knots in the system. All the pulp had previously been passed through four Stadler rotary knotters equipped with bronze plates with ¼-inch round perforations.

Several conditions were tried but each showed no lowering of the dirt count.

In order to eliminate the difficulty of knots plugging the Vortrap, stock which had been riffled and screened was passed to the Vortrap.

Results of this series are in Table V.

Results were not consistent and indicated that, for the type of dirt encountered in the unbleached pulp, the Vortrap is relatively inefficient in its removal.

Table III

Grams Inorganic from Riffler	Grams Inorganic from Vortrap 200 GPM's 1.0% Consis.	Grams Inorganic from Vortrap 200 GPM's 0.5% Consis.	% Material "Bled"
	STANDARD Stock		
764	2,610	2,550	4.0%
764	1,420	2,770	4.0%
764	2,160	------	4.0%
Ave. 764	2,063	2,660	
	BOOK Stock		
1,529	2,215	3,535	4.0%
1,529	3,960	2,250	4.0%
1,529	------	3,250	4.0%
Ave. 1,529	3,088	3,012	

Grams material based on 200 A. D. Tons per 24 Hours.

Table IV

Grams Inorganic from Riffler	Grams Inorganic from Vortrap 270 GPM's 0.75% Consis.	Grams Inorganic from Vortrap 200 GPM 1.0% Consis.	Grams Inorganic from Vortrap 270 GPM 1.0% Consis.
764	2,500	2,610	1,366
764	1,420	1,420	1,615
764	2,440	2,405	1,350
764	------	1,890	1,626
Ave. 764	2,120	2,081	1,489

Bleed between 4% and 5%.

Grams material based on 200 A. D. Tons.

STANDARD Stock.

Table V

Wet Dirt Count			Conditions of Experiment	
To Vortrap	From Vortrap	% Removal	Speed GPM	Consis. %
12,015	11,440	5.0%	200	0.5%
12,015	10,880	9.5%	250	0.5%
13,050	13,745	Negative	200	0.75%
13,050	15,315	Negative	250	0.75%
12,185	12,300	Negative	200	1.0%
9,735	7,466	23.3%	250	1.0%

STANDARD Unbeached Stock

"Bleed" = 5.0%

Conclusions

1. The Vortrap is a simple, easily operated mechanism requiring little, if any, maintenance.

2. In consideration of the experiments conducted with a single pass through one Vortrap operating normally on unscreened bleached stock, it may be concluded that the Vortrap is not as efficient in removing inorganic material as are the present bleached rifflers.

3. Operation of one Vortrap with at least 1.0% of the processed stock "bled-off" and re-Vortrapped indicates the Vortrap to be more efficient than the Rifflers in removing inorganic material.

4. Operations on bleached pulp at lower consistencies (0.5%) were slightly better in dirt removal, but possibly do not warrant the additional Vortraps necessary.

5. When the Vortrap is operated at 270 gallons per minute and 1.0% consistency, the dirt removal is not as good as when operated under other conditions. Nevertheless, the dirt removal is at least 50% better than that of the riffler. Such operation would require less Vortraps than originally planned.

6. Consideration of the experiments conducted on unbleached screened pulp indicates the Vortrap to be relatively inefficient when compared to the rifflers and screens.

• The writer wishes to express his appreciation to Edward P. Wood, technical director, Longview Mill, Pulp Division, Weyerhaeuser Timber Company, and to others of the organization who acted as advisors in this work, and also to A. H. Lundberg of Seattle for his timely suggestions.

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[1] Freeman, Horace, "The History of the Vortrap." Pacific Pulp and Paper Industry 11 No. 8:48 (August, 1937).

[2] Freeman, H. and Skelton, C. H., "Progress in the Removal of Dirt from Pulp and Paper." Pulp and Paper Magazine of Canada 40 No. 2:103-5 (Convention Issue, 1939).

[3] Freeman, Horace, "The Vortrap." Paper Trade Journal 106 No. 11:43-6 (March 17, 1938).

Blockade Hits Sweden's Forest Industries

• The extent to which Sweden's first-ranking industry—forest products—has been disorganized by the war blockade was strikingly revealed in a recent radio broadcast by an official of one of the most important Swedish cellulose-producing companies, according to the U. S. Department of Commerce. For seventy years, it was pointed out, Sweden's forests have accounted for more than half the value of the nation's total income from foreign trade. In normal times, the number of workers employed in the forest and allied industries amounted to 400,000, a total which at the height of the season was swelled to a half-million.

Since the establishment of the blockade, Sweden has lost foreign outlets which absorbed 75 per cent of its forest products exports, including the United States, South America, Japan, England and France. The result of this development has been entire or part stagnation in a number of pulp factories, paper mills, grinderies and saw mills. The mechanical wod pulp branch of the paper pulp industry has been particularly hard hit by the consequences of the war.

Increased exports of pulp and paper to Germany and the occupied countries have provided some work for these industries, but these shipments amount to only a fraction of what Sweden actually needs to export. Attempts have been and are now being made in the various branches of the Swedish forest industry to develop new openings for labor and opportunities to make profit. Production of pulp for feedstuffs and for motor fuel alcohol are two developments arising out of the present situation. Four new factories are now under construction in different parts of Sweden for the manufacture of alcohol. However, such activities, at best, will keep occupied only a very small part of the forest products industry.

Camas Mill Signs Now Installed

• On December 11th one of the two new neon tube signs on the bag factory of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, was lighted for the first time. A like sign has since been completed, this second one facing to the east for the benefit of the westbound traffic. These signs now announce to the motoring public the identity of the huge Camas mill, which up until now has been the source of much local inquiry from tourists and others passing by the plant.

Local investigations have disclosed 5,200 motor vehicles passing the mill daily. Of these about 1,250 are "through traffic" and 900 to 1,000 of the vehicles are tourist-bound.

Each of the two signs are 82½ feet long by 9 feet high. The top lines of the signs reads "CROWN WILLAMETTE PAPER COMPANY" and are 30 inches high, made of three-dimensional letters faced with green fluorescent tubing. The "DIVISION OF" line is made of 12-inch letters faced with cerise tubing, and the "CROWN ZELLERBACH CORPORATION" line in each of the signs is 20 inches high in cerise letters. Faces of the signs are painted light green and cerise, to correspond to the tubing, with silver outline and black depth of channel, so the signs can be readable when the tubes are not lit.

Japan Curtails Magazines and Newspapers

• The war time need for Japan to consume its stocks of paper has resulted in a government order further curtailing the number of magazines and newspapers permitted to be published in that country. During the past two years the Home Ministry, with the assistance of other government agencies, has been engaged in eliminating publications of a character not in keeping with the country's "new morality." Under the latest government order, however, the heaviest blows appear to fall on economic, political and scientific journals.

The government's plan of curtailing publications is being carried out under the direction of an organization known as the "Publishing Culture Association" set up in Tokyo last December following negotiations among the Home, Education, and Commerce and Industry ministries. After an investigation of the situation, the association recommended that the number of photographic magazines published in Japan be reduced from 12 to 4; that existing economic journals, now numbering about 200, be cut to 20, and that magazines dealing with politics, science, industry and miscellaneous subjects be reduced between 30 and 50 per cent.

Weyerhaeuser Holds Open House at Longview

• Open house was held at the Weyerhaeuser Timber Company operations at Longview, Washington, the afternoon of January 30th, upon the opening of a new cafeteria for the employees of the company. Approximately 400 employees and their families visited the Longview Mill, Pulp Division Weyerhaeuser Timber Company, during the afternoon.

Pacific Straw Changes Name, Makes Improvements

• Effective February 15th the Pacific Straw Paper & Board Company of Longview, Washington, changed its name to Pacific Paperboard Company, which is descriptive of its operations. The original name adopted at the time the company was organized in 1926, and when it was intended that straw paper would be one of the products, did not properly describe the company's activities for the plan to use straw was abandoned early in the mill's history.

Pacific Paperboard Company, under the management of Arthur Zimmerman, is making a number of improvements. Two of the latest steps to improve production and quality have been the installation of a rewinder and a sheet liner.

By February 15th an 84-inch No. 12 Cameron rewinder will be in operation. It was ordered from the Pacific Coast Supply Company, Pacific Coast representatives for the Cameron Machine Company of Brooklyn, N. Y. The new rewinder will make paper rolls from 1½ inches to 84 inches in width at the rate of 1500 lineal feet per minute to a maximum diameter of 60 inches. Narrow rolls can be made in groups to the width of the machine, 84 inches. Power is applied through a variable speed clutch.

The other new machine, already operating, is a Parry 50-inch sheet liner, employed to glue liner to chipboard for use in paper boxes. In operation, the sheet liner applies glue to the liner as it comes from the roll. The chipboard is fed in the front of the machine and pressed against the glued surface of the liner. The laminated sheet then passes through eleven pair of steam heated rolls, the glue being completely dry by the time the sheet reaches the discharge end of the machine.

A 5-horsepower electric motor drives the sheet liner through a variable speed transmission up to a maximum speed of 300 lineal feet per minute.

Roy Kingsley Transferred to Shelton

• R. Roy Kingsley, head millwright of the sawmill of Rayonier Incorporated at Port Angeles, transferred January 27 to the Shelton division of Rayonier. Kingsley had been connected with the Port Angeles plant since its construction, coming to it from the old Charles Nelson lumber mill in the same city. He lived in Port Angeles 18 years.

Wear Gives Talk Before Camas Paper School

• L. H. Wear, Pacific Northwest representative of the Taylor Instrument Companies, gave a talk on "Instrumentation," before the fourth year class of the Camas Paper School at Camas, Washington, on the evening of January 29th.

Ramstads Greet Baby Boy

• On January 28th the stork brought a 7-pound 14-ounce baby boy to Mr. and Mrs. Carl A. Ramstad of Everett. The young fellow was promptly named David Andrew.

Mr. Ramstad is in charge of instrumentation for the Soundview Pulp Company.

TAPPI Holds Dinner Meeting in Tacoma

Hears papers on "Measurement of Vapor Pressures of Sulfurous Acid Solutions," and "The Vortrap as a Means of Removing Dirt from Bleached and Unbleached Sulphite Pulp" ✓ ✓ ✓ Explanation of occupational deferment from draft ✓ ✓ ✓ Joint meeting with Superintendents to be held at Portland Hotel, Portland, June 6th and 7th.

● The fourth of the 1940-1941 series of dinner meetings sponsored by the Pacific Section of TAPPI was held at the Winthrop Hotel in Tacoma, Washington, on Tuesday evening, February 4th, with eighty-eight men in attendance.

Fred A. Olmsted, chairman of the Pacific Section presided. He introduced Niles M. Anderson, chairman of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association, who announced plans for the joint meeting of the two associations in June.

The executive committees of TAPPI and the Superintendents have decided to hold the joint meeting on June 6th and 7th at the Portland Hotel in Portland, Oregon, said Mr. Anderson. He introduced Harry H. Richmond, chief engineer of the Electric Steel Foundry Company of Portland, who will be general chairman of the meeting.

Merrill E. Norwood, paper mill superintendent, Columbia River Paper Mills, and first vice chairman of the Pacific Coast Division of the Superintendents; and Carl E. Braun, vice president and mill manager of the Hawley Pulp & Paper Company and vice chairman of the Pacific Section of TAPPI, will serve as joint chairmen in charge of arranging the program of papers for the Portland meeting.

Carl Braun Named Vice Chairman

● Mr. Olmsted announced that W. Norman Kelly, vice chairman of the Pacific Section and manager, Longview Mill, Pulp Division Weyerhaeuser Timber Company, had resigned his TAPPI position, expressing his deep regret that the pressure of work forced him to do so.

The executive committee of TAPPI, said Mr. Olmsted, had drafted Carl E. Braun, vice president and mill manager of the Hawley Pulp & Paper Company of Oregon City, to serve Mr. Kelly's unexpired term. He introduced Mr. Braun who said he was glad of the opportunity to serve the industry through TAPPI.

The first paper presented at the Tacoma meeting was "Measurement of Vapor Pressures of Sulfurous Acid Solutions," by W. L. Beuschlein, professor of chemical engineering, Department of Chemistry and Chemical Engineering, University of Washington, Seattle. Professor Beuschlein's paper is published in this number. Extensive discussions took place following the paper's presentation.

The second paper was entered in the contest for the Pacific Section's annual Shibley Award for the best paper presented by a mill man at the 1940-1941 dinner meetings. L. E. Stevenson, technical department, Longview Mill, Pulp Division Weyerhaeuser Timber Company, Longview, Washington, offered a paper on, "The Vortrap as a Means of Removing Dirt from Bleached and Unbleached Sulphite Pulp." It is also published in this issue. Discussion followed Mr. Stevenson's paper.

Draft Deferment

● A third speaker was Captain Fairman B. Lee, Ordnance Department, United States Army, advisor on occupational deferments, state selective service staff. Captain Lee explained the Selective Service Act as it deals with occupational deferments, saying that his purpose was to eliminate misunderstandings as to what occupations warranted deferment. His talk included the statement sent January 30th to personnel officers and supervisors in industry by the state director of selective service for Washington. The statement follows:

Class II Occupational Deferments

● "In order that there may be uniformity in the information being furnished to those who desire to claim deferment, the following procedure is suggested:

"Claims for occupational deferment should not be received or considered by the Local Board until the registrant's questionnaire has been mailed and returned.

"Questionnaires are mailed to registrants according to their order numbers which were determined by lot. The registrant has five days from the time the questionnaire was mailed to fill it in and return it to the Local Board. The answers to questions in Series IV and V, the "Registrant's Statement Regarding Classification" and any affidavit submitted by the employer form the basis of the facts on which the **Local Board** determines the individual's eligibility for Class II deferment. The **Local Board may place a registrant in Class II whether or not the registrant or his employer claims such a deferment.**

"A registrant shall be considered a "necessary man" in industry, business, employment, agricultural pursuit, governmental service, or in any other service or endeavor, including training or preparation therefor, **ONLY WHEN ALL OF THESE CONDITIONS EXIST.**

(a) He is, or but for a seasonal or temporary interruption would be engaged in such activity.

(b) He cannot be replaced satisfactorily because of a shortage of persons with his qualifications or skill in such activity.

(c) His removal would cause a material loss of effectiveness in such activity.

"The Act provides that "No deferment from such training and service shall be made in the case of any individual except upon the basis of the **STATUS** of such individual, and no such deferment shall be made of individuals by occupational groups, or groups of individuals in any plant or institution."

"An employer who desires to have an employee placed in Class II should:

(a) Arrange for the employee to notify the employer when he receives his questionnaire.

(b) Offer to assist the employee in filling in Series IV and to give the employee any information he desires in this regard. **(Of course the employer may not require the employee to accept such assistance.)**

(c) Fill in and swear to an Affidavit (Form 42) setting forth the facts on which he believes the employee should be placed in Class II.

The Next TAPPI Dinner Meeting will be held at The Hotel Monticello, Longview, Washington on Tuesday evening, March 4th at 6:30 P. M.

"In filling out an affidavit the employer may obtain copies of Form 42 from the Local Board, or he may draft a similar affidavit on his own stationery. As indicated on the back of Form 42, the affidavit may be sworn to by any of the listed officials, and no fee shall be charged therefor.

"The statements contained in the affidavit should be carefully prepared and checked for accuracy, since they are made under oath. They should contain only those facts known to be true by the person signing the affidavit. These statements should be responsive to the three conditions for Class II deferment, and should be in support or correction of the statements of the employee contained in his answers to Series IV of the questionnaire, and his 'Statement Regarding Classification.'

"Specifically, such an affidavit should contain:

"1. An accurate and full description of the employee's job in sufficient detail to allow the Local Board to understand fully the duties that the individaul actually performs.

"2. A statement of the relative shortage of persons with his special qualifications and skill. This part of the statement should include all facts which would assist the Local Board in determining the availability in that community of persons with that particular skill.

"3. The employer should then state any facts which support the claim that the removal of this employee, without immediate replacement, would cause a material and substantial loss of effectiveness or productivity in the employer's enterprise.

"4. An estimate of the length of time it will take to train or otherwise secure a replacement for this employee and the steps which the employer proposes to take to secure such replacement.

"In addition to the above facts, which go directly to the question in issue, the employer should give a brief description of his products or services and their usefulness and contributions to the employment or wellbeing of the community of the Nation.

"Therefore, the employer should make every effort possible in the intervening period to train or secure a replacement, so that the registrant may be inducted for his year's training.

"SPECIAL NOTE: The registrant has FIVE days to return his questionnaire to his Local Board. The employer should file the request for deferment **WITHIN THE SAME TIME. IT IS THEREFORE NECESSARY THAT YOU BE NOTIFIED IMMEDIATELY WHEN THE REGISTRANT RECEIVES HIS QUESTIONNAIRE."**

Chairman Olmsted announced that the next dinner meeting will be held at the Hotel Monticello, Longview, Washington, on Tuesday evening, March 4th, at 6:30 p. m. The program will be announced later.

The following men attended the Tacoma dinner meeting, February 4, 1941:

• **Gerald F. Alcorn,** Pulp Division, Weyerhaeuser Timber Co., Everett; **Niles N. Anderson,** St. Regis Paper Company, Kraft Pulp Division, Tacoma; **A. J. Bailey,** Dept. of Chemistry and Chemical Engineering, University of Washington, Seattle; **J. H. Baker,** Pennsylvania Salt Mfg. Co. of Washington, Tacoma; **Walter R. Baumann,** Pennsylvania Salt Mfg. Co. of Washington, Tacoma; **C. B. Baxter,** Tacoma Plumbing Supply Co., Tacoma; **R. B. Beal,** The Flox Company, Minneapolis; **W. L. Beuschlein,** Dept. of Chemistry and Chemical Engineering, University of Washington, Seattle; **J. R. Blair,** Pulp Division, Weyerhaeuser Timber Co., Everett; **Carl E. Braun,** Hawley Pulp & Paper Company, Oregon City.

Robert E. Brown, St. Regis Paper Company, Kraft Pulp Division, Tacoma; **H. J. Browne,** St. Regis Paper Co., Kraft Pulp Division, Tacoma; **A. M. Buck,** Pulp Division, Weyerhaeuser Timber Co., Everett; **A. M. Cadigan,** St. Regis Paper Co., Kraft Pulp Division, Tacoma; **G. H. Cady,** Dept. of Chemistry and Chemical Engineering, University of Washington, Seattle; **Claude Callaghan,** The Flox Company, Tacoma; **R. S. Carey,** National Aniline & Chemical Co., Portland; **Kenneth Chapman,** Pulp Division, Weyerhaeuser Timber Co., Everett; **R. E. Chase,** R. E. Chase Co., Tacoma; **R. D. Colburn,** Pulp Division, Weyerhaeuser Timber Co., Everett.

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Porter Dickie Now in Port Angeles

• Porter T. Dickie, formerly attached to the Lebanon, Oregon, division of Crown Zellerbach Corporation, transferred recently to the Washington Pulp and Paper division at Port Angeles. He is a member of the technical control staff of Washington Pulp, which Ray Austin heads.

Mill Bowlers Finish First Half at Top

• The bowling team of the Pacific Coast Paper Mills of Bellingham finished the first half play-off of the Industrial League in the top spot.

Bowling isn't the only sport carried on at the mill during the winter months as four teams turn out regularly for a session of high-class horseshoe pitching.

Artist Paints Bellingham Mill

• After working one hundred and thirty-seven hours, Mr. Keith Munroe, local artist, has completed a massive and highly detailed water color picture of the pulp mill of the Puget Sound Pulp and Timber Company. The detail of the picture is perfect, even to shadows under the handrail of a locomotive shunting cars onto a sidetrack. The picture will hang in a conspicuous place in the company offices.

Mrs. J. J. Herb Passes In Vancouver

• Mrs. J. J. Herb, wife of the founder and president of the Pacific Coast Paper Mills at Bellingham and of the Westminster Paper Company, Ltd., of New Westminster, B. C., passed away December 10th in Vancouver, B. C., following an operation.

The Scandinavian Pulp Situation As of November

● The comments of The Swedish Wood Pulp Journal for October 31st are of interest to American producers of pulp and paper. We quote:

"The quantities that can still be imported from Sweden during the next few months by Holland, Belgium and France have been distributed among the Swedish mills by mutual agreement, and are already partly sold. A large proportion of Sweden's quota will, however, be delivered under older, still valid contracts.

"It is as yet impossible to say how the French buyers will be able to pay for their purchases. They can, of course, pay the money into a Paris bank for the account of the Swedish seller, but how it can afterwards be transferred to Sweden has not yet been settled. As far as can be seen, some clearing or compensation agreement between Sweden and France will be the only means, but it will certainly be difficult to arrange one that will render even a fairly satisfactory export for our large export industries possible. It will be remembered that even under normal conditions there was considerable difficulty in achieving a tolerable balance between our exports to and imports from France, and at the present time, when France's export of the goods we need is naturally very circumscribed, the problem will surely be much more difficult.

"Shipments to Italy seem to continue normally. Shipments to Spain are reported to have begun, though to a very limited extent. They have to go to German ports on the Baltic or the North Sea, and from there by rail.

"The approaching winter is causing the cellulose and wood pulp mills anxiety whether Germany will be able to fetch, before the end of the season, the pulp bought for delivery this year.

"In case a sufficiency of German tonnage cannot be made available, the requisite Swedish tonnage could be obtained if the German buyers would agree to pay sufficiently high freights to induce the Swedish ship-owners to take an interest in the pulp shipments to Germany.

"In previous market reports we have repeatedly mentioned the negotiations between Sweden, Finland, Norway, and Germany regarding a division of the quantities of pulp to be imported within the next few months by the countries occupied by Germany, primarily Holland, Belgium, and France.

"At the same time, however, the prospects of resuming the S. P. S. cooperation existing before the outbreak of war have also been discussed. That organization, which was established in 1930, dealt only with sulphite pulp, and embraced the sulphite industries of Sweden, Norway, Finland, Germany, and what was formerly Austria, Czechoslovakia, and Memelland. When war broke out last autumn negotiations were about to be concluded for a new S. P. S. agreement, on partly different principles, to come into force from the beginning of 1940.

"The discussions that have been going on in recent months have primarily aimed at creating a firmer and more effective organization than the old S. P. S., the idea being that the Council should not only—as in the old S. P. S.—fix the export quotas of each participating country, but also—when necessary—minimum prices. It must be remembered that even while the old agreement was in force, minimum prices were by special agreement stipulated for several periods both in the European markets and in America.

"In view of the rumours that joint sales of the members' quotas are planned, it may be said that nothing of the kind has been intended or even discussed. We are further informed that any agreement reached will contain no stipulations that fully secure the influence of Sweden on the fixing of export quotas or minimum prices.

"As an agreement on the above lines could only be partially applied under present conditions, anything done now would necessarily be provisional until peace is restored. Such temporary arrangements would mainly include a codification of the system already applied in recent months, e. g., for deliveries to the countries occupied by Germany. As long as imports to most countries to which we can at all export pulp are government controlled, intimate cooperation both with other countries and within Sweden is absolutely essential. Regarding the necessity of international cooperation in the present situation, it must also be pointed out that practically all our at present possible exports of chemical and mechanical pulp are going to Germany or German-occupied countries, or must be transited through Germany."

Sweden Increasing Wood Alcohol Production

● The first results of the Swedish Government's new alcohol program which has stimulated the Swedish pulp industry's interest in the production of this item are now becoming evident. One new sulphite alcohol plant has just been completed and four more new palnts are under construction. The five establishments together will have a total maximum capacity of approximately 18,000,000 liters (4,500,000 gallons), 95 per cent pure alcohol annually.

The sulphite pulp mill, Ljusnan, a subsidiary of the Marma combine, has just started preparations for an expansion of its alcohol plant at Wallvik. This plant now has a capacity of 2,000,000 liters 95 per cent pure alcohol, which it is planned to expand to a maximum production of 4,000,000 liters. It is reported that the Uddeholm Company's large alcohol plant at Skoghall will soon be enlarged to a capacity of 5,000,000 liters from the present maximum of 3,200,000 liters.

Norwegians Building Wood Alcohol Plant

● The Swedish Wood Pulp Journal of November 30, 1940, states that:

"Korsnas Sagverks, A. B., is now building at Karskar, Norway, a factory for the manufacture of alcohol from wood by the "Defibrator" method worked out by two engineers, Messrs. Asplund and Holst. The waste from the company's sawmills and cellulose mills will be the raw material.

"This waste is treated with diluted sulphuric acid to extract the glucose which in turn is fermented into alcohol. Production is estimated at 3,000,000 litres annually containing 95 per cent alcohol. This will be rectified in the Karskar sulphite alcohol factory. The waste from the saccharification process will be used as fuel in the company's boiler plant. The new alcohol plant will be ready for work March 1, 1941.

Camas Paper School Graduation Banquets

● Banquets are to be held March 10th and 11th at the Crown Willamette Inn, Camas, Washington, for the paper school students of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation.

It is expedient to hold two dinners at the close of the 1940-1941 term instead of the usual one, to accommodate the 400 persons, including students, foremen and visitors, who are expected to attend.

First and second year students will be feted March 10th and third and fourth year students the following night.

German Waste Paper Utilization

● The U. S. Department of Commerce reports that while the general tendency underlying the wartime utilization of waste paper has been toward an increase in the quantity of paper collected and used, the Paper Manufacturers Association (Reichsstelle fuer Papier) since the beginning of 1940 has placed increasing emphasis on grading and "directing" the special grades of waste to consumers for purposes considered important, according to the press. This trend is reflected in the schedule of prices to consumers. Fixed maximum prices range from RM 2.40 per 100 kilograms for unsorted, uncleaned waste paper to RM 18.75 per 100 kilograms for wood-free white trimmings.

The amount of waste paper available has decreased since the beginning of the war, owing to the decline in the number of professional collectors; to the large quantities of paper lost in the form of periodicals and other packages sent to the front; and to the reduction in paper waste in the manufacture of paper products, notably of stationery, as a consequence of the very comprehensive standardization of sizes and types.

Collections from households are carried out by school boys.

Camas Sample Department In New Quarters

● The sample department of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, Washington, has moved from the basement of the main office building to the east end of the old bag warehouse building. This puts the sample department directly beneath the Camas mill laboratory, and the office of Fred Olmsted, technical supervisor.

There are five men in the new quarters and there is one woman in the bag factory and one in the converting plant, all members of the sample department. Duties of this department are: (1) to keep a supply of standard samples of colored paper and other qualities of the various papers for control purposes in the mill; (2) keep and file daily samples covering all of the mill's production; (3) collect and provide sales department with sample stock of all grades manufactured; (4) assemble sample swatches for use of the sales department.

The new location of the sample department brings its activities into closer cooperation with the rest of the technical department and also makes for greater efficiency and more spacious quarters.

The Combustion of Waste Wood Products

by H. W. BEECHER* and R. D. WATT**

THE waste products resulting from the manufacture of lumber, plywood, or cellulose for conversion into pulp are available as fuel. Manifestly, any portion of the log which can be economically converted into more valuable material should neither be classified as waste wood nor used for fuel. Sawdust and shavings can be handled for burning without further processing. Slabs, edgings, trimmings, and other waste products require further size reduction to prepare them for rapid combustion, easy transportation, and convenient handling. Such material is usually processed by a mechanical masticator, commonly known as a "hog." The product so obtained, together with sawdust and shavings, forms a mixed fuel called "hog fuel." The term "hog fuel" will be used to describe the waste-wood products dealt with in this paper, whether they be sawdust, shavings, or a mixture of these with hogged materials.

Economic Aspects

● The cheapest power for operation of a sawmill is energy generated from steam produced by burning the resulting waste materials. This waste must be removed or destroyed and is available to the producing sawmill without transportation costs. Whenever sawmills are not located within economical transportation distance from external hog-fuel markets, large investments in refuse burners are necessary in order to dispose of excess waste fuel. In a country with an abundance of cheap hydroelectric power, fuel must be inexpensive to permit steam-plant competition, except where steam is required for process.

The mill production cost for the hogged portion of fuel is from 10 cents to 15 cents per unit, largely made up of power, operation and maintenance expenses of the hogging equipment. The mill operator should receive a reasonable return on his investment and, if possible, secure a profit on his waste material. Prices charged for hog fuel vary from 50 cents to $1.50 per unit at the producing mill, depending upon the supply and demand and not upon the cost of production. If a mill is isolated from the market in a community where the other fuel-consuming activities also produce hog fuel as a by-product, there is competition for the consuming market and the mill operator must then be satisfied with smaller returns. Conversely, if the producing mill is located in an industrial center containing fuel-consuming plants which are not producers of fuel, an absorbing market is available, permitting the mill operator to secure a profit on his waste materials. In recent years the revenues from hog-fuel sales have represented a large part of the total profits of many mills.

The large volume and weight of hog fuel per available Btu makes the transportation cost loom large in the total cost to the consumer. The economical marketing zone is limited by transportation costs. Frequently, greater cost is involved in transportation and handling than the actual price paid by the consumer to the producer for the fuel at the point of manufacture. In spite of high transportation costs, hog fuel is generally available to the consumer at a cost per million Btu, comparing favorably with the costs of other types of fuel in the lowest-fuel cost areas of the United States. Hog fuel is, therefore, the principal fuel used in the Pacific Northwest for steam production.

The high moisture content of hog fuel materially reduces the obtainable thermal efficiencies of boiler plants, as compared with the efficiencies secured with other fuels. This necessitates comparison of hog fuel with other fuels on the basis of their relative cost per available Btu. Many consumers of hog fuel pay as little as 50 cents a unit, delivered. In other Northwest plants the hog-fuel cost reaches $3.50 per unit. A unit of hog-fuel measurement occupies 200 cu. ft. An average unit of hog fuel will contain approximately 20,000,000 Btu. Boiler-plant efficiencies with hog fuel vary, depending upon the type of installation, the percentage of rating at which the boiler plant operates, and whether air heaters are installed for recovery of additional heat from the boiler gases. These efficiencies vary from 45 per cent on the poorer installations to 65 per cent on the more modern and better equipped boiler plants.

To indicate the general low cost of hog fuel for the production of steam, it may be noted that with 60 per cent efficiency the available heat per average unit would be 12,000,000 Btu. At a cost of $1 per unit, the corresponding cost of steam production would be 8⅓ cents per million Btu input. With fuel oil costing $1 per bbl. and with 83 per cent boiler efficiency, the heat available in steam would be 5,200,000 Btu per bbl. and the corresponding cost per million Btu input would be 19 cents. With coal having a heat value of 12,500 Btu per lb. and costing $4 per ton and with an average boiler efficiency of 80 per cent, the corresponding cost of steam per million Btu input would be 20 cents. This comparison indicates that, in so far as a consideration of the combustion of hog fuel is concerned, a low-cost fuel is involved which has not yet encouraged the engineering research or the capital investment which would be warranted were it a higher-priced commodity.

Measurement of Hog Fuel

● Neither buyers nor sellers of hog fuel have been willing to spend money to measure accurately fuel having such low cost per million available Btu. The seller has not had competition from fuels other than hog fuel from competing mills, as this fuel has been used principally in localities where neither oil nor coal has been competitive. The buyer, realizing the economic advantage in using hog fuel, as compared with other available fuels, has been unmindful of the advantages to be obtained by purchasing scientifically and determining the actual fuel values obtained for his dollar.

To compare and purchase on an available Btu basis one must purchase by weight, rather than by measurement, and make proper corrections for average moisture content. The simplicity and comparatively low cost of volumetric measurement has delayed the adoption

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of the more scientific system. The general adoption of volumetric measurement dates back 30 years when hog-fuel prices were yet lower than those prevailing today. The "unit" on which most hog fuel is purchased and sold contains 200 cu. ft. (material and voids) irrespective of the compacting of the fuel brought about by the shape, size, or handling of the measuring containers. The process of mixing hog fuel and sawdust, in which the sawdust tends to fill the voids, provides greater fuel content per unit of measure. No allowance or credit is ordinarily given by the buyer for the greater number of Btu in a compacted unit. As a result, there is wide variation in the heating value per unit as sold. Another element of variation which is waived with the present measurement basis is moisture content with its serious effect on the availability of the heat units. With the present measurement basis, a buyer may obtain more heat per dollar from a unit for which he pays $1.50 than for another unit for which he pays only $1. The development of weighing-belt scales shortens the time until much of the hog fuel used in large plants will be weighed and, with proper moisture determination, be bought, sold, and compared on a Btu basis.

Availability of Waste-Wood Fuel

● As long as lumber is cut from logs, there will be waste for which the primary market will be among the consumers of cheap fuel. A detailed survey by the Forest Service and reported by Allen H. Hodgson showed that, in the manufacturing of slightly over 10,000,000,000 fbm of green, rough-sawed lumber in the Douglas fir region in the year 1929, over 619,000,000 cu. ft. of solid-measure normal sawmill waste was produced. An analysis of the total volume of 1,354,000,000 cu. ft. of sound wood in the logs showed that approximately 67 per cent (911,000,000 cu. ft.) was converted into green, rough-sawed lumber; nearly 19 per cent (261,000,000 cu. ft.) became slabs, edgings, and trimmings; the balance, 14 per cent (191,000,000 cu. ft.) was sawdust. In addition to the sound wood there was approximately 167,000,000 cu. ft. solid measure of bark. This indicates that of the solid-wood material, inclusive of bark represented by the logs as delivered to the sawmill, 41 per cent is so-called "waste" and available for fuel.

We have been unable to find the result of any studies made to determine the percentage of solid wood in the tree represented by the solid wood in the saw logs. It is well known that the tops and branches cannot be economically handled, transported, and utilized for the production of lumber, as the available wood content, when converted into lumber, will not bring sufficient revenue to the mill to cover the cost of removing this material from the forest. The branches and tops left in the forest are a fire hazard and, if the cost of handling and removing them approached the price obtainable for the materials produced, they would be removed by the mills at a loss rather than be left in the forest as a menace. It is reasonable to assume that the material left in the forest is sufficient to make up the difference between 41 and 50 per cent, and to state broadly that, of the wood content of the average tree as logged and utilized in the Northwest, less than 50 per cent is converted into lumber and its allied products. The balance is an economic waste except for the value recovered as fuel.

While there may be some slight improvement in utilization, the greatest encouragement for the conservationist comes from the possibility of chemically treating selected portions of existing waste for production of cellulose products. Another field is fermentation and production of alcohol. A third utilization process is destructive distillation which would give charcoal, numerous by-products, and some steam for power production by burning the gas after cleansing of by-products. All these possibilities justify the statement that, as long as sawmills in the Northwest are operating at reasonable capacities, hog fuel in abundance will be available for industrial use.

There will remain a wide price range to the consumer at his place of use. As a consumer goes farther afield to secure his fuel in competition with other consumers, the more fortunately located sawmills with lower transportation costs will raise their prices and derive greater profits. Greater consuming markets will advance the prices so that small mills, beyond the zone of economical transportation at present fuel prices, will be provided with a market for materials now destroyed in refuse burners. Such destruction, while wasteful, is necessary without a market for this material.

Transportation of Hog Fuel

● Where water transportation is available without rehandling, it is by far the cheapest method of moving hog fuel. Hog fuel is towed on barges as great a distance as 350 miles.

In certain localities, transportation must be by rail in specially fitted cars. Tariffs are either per car or per 100 lb. weight. In either case it is desirable to have car contents a maximum. Cars are constructed with sides extending to maximum clearance height for the division in which they are to operate. A 50-ft. car may be constructed to handle 35 units. However, most cars carry from 20 to 30 units.

The use of trucks for hog-fuel transportation is increasing. Special bodies carry from 4 to 6 units where regulations will permit. They load by gravity from bins, or conveyers, and are fitted with power dumps by which they are discharged into hoppers. Truck-transportation cost is dependent upon the length of haul which affects the portion of hourly truck and driver costs chargeable to each unit of hog fuel.

Each transportation problem must be independently treated to obtain the least possible cost. No set schedule of probable cost can be suggested as generally applying to any of the three methods outlined.

In rare cases, the hog-fuel-producing plant is situated near a consuming market and very low transportation costs can be obtained by use of belt conveyers between plants.

Except where necessary to elevate fuel steeply or to take off at several intermediate points, belt conveyers should be used. Even with multiple-point discharge, it frequently becomes desirable to use trough belts with travelling trippers or flat belts with unloading slices rather than to install scraper conveyers.

Belt conveyers are cheaper to operate than flight conveyers as they require less power, attention, and maintenance. Where belt conveyers cannot be conveniently installed, it is necessary to use special scraper or drug conveyers. All boiler-feed conveyers should be provided to convey more than current requirements and to return surplus to supply source, rather than to attempt regulation of the conveyed fuel supply in synchronism with fuel consumptions.

The amount of fuel storage required depends upon reliability of supply, possible interruption to transportation, and the necessity of avoiding plant outage. Plant consumptions, load factors, and operating intervals also affect the amount

of storage which should be provided. The possibility of using oil or other more expensive fuel for emergency operation, with its attendant higher fuel cost, should be weighed against the fixed charges on average hog-fuel storage and recovery systems.

Heating Value

● The high percentage of oxygen in wood reduces the heat content per pound as it is combined with carbon and hydrogen to form carbohydrates and, therefore, the total heat of combination of the combustibles is not all available. The manner in which these three elements are combined is not definitely known and the use of Dulong's formula, as applied to the ultimate analysis of wood, will not result in a Btu value corresponding to that obtained from calorimetric determinations. Hog fuel as normally delivered to the furnaces contains a high percentage of moisture. A portion of this is extraneous moisture, either resulting from wet logs, water lubrication of saws, or rain when fuel has been exposed. Most of the moisture, however, is in the cellular structure of the wood. The fuel, as received from the average sawmill, contains material with high moisture content from the sap wood of the log, material with a medium moisture content from the heartwood, and material with comparatively low moisture content from wood dried in commercial dry kilns.

In computing combustion results, moisture determinations are reported as the percentage of the total weight of wood and moisture represented by the moisture. This means that fuel containing 50 per cent moisture contains 1 lb. of water per lb. of dry fuel. With the high oxygen content of wood there would be 1¾ lb. of water per lb. of combustible. If the oxygen were combined with the hydrogen, as assumed in Dulong's formula, 50 per cent moisture in the fuel would correspond to approximately 2 lbs. of water per lb. of ununited or available combustible. It is interesting to note, when the moisture content is increased from 50 to 60 per cent, the weight of moisture in the fuel is increased from 1 to 1½ lbs. per lb. of dry fuel. The hog fuel used in industrial plants of the Northwest will average from 25 per cent moisture, when principally kiln-dried material, to from 57 to 60 per cent moisture when largely green hemlock.

The available heat in hog fuel is a function of the moisture content. The heat necessary to raise the temperature of the wet fuel to 212 F., evaporate the water, and superheat the vapor to the exit-gas temperature is not available for steam production. This accounts for a substantial portion of the total losses in hog-fuel combustion.

All species of wood considered herein have approximately the same heating value on a bone-dry basis which will average 8900 Btu per lb. of dry wood. However, some species are better fuels than others. Hemlock is not as good as fir. Spruce is better than hemlock, but poorer than fir. Cedar is a light fuel and requires a specially designed furnace for good results. Hemlock, as ordinarily available as fuel, has a high moisture content and does not readily part with its moisture. At least 20 to 25 per cent more capacity can be obtained from given furnaces and combustion chambers with fir fuel having about 45 per cent moisture content than with hemlock having 57 per cent moisture.

The heating value of stored hog fuel varies with the time in storage. Storage of hog fuel in the open decreases available Btu in fuel faster than storage under cover. This loss of heat value is attributed to slow oxidation which takes place at low temperatures. Cultures have been made from samples of hog fuel after storage over a considerable period which show an indication of molds and other wood-destroying fungi. These reactions are exothermic and the heat is lost.

Combustion

● Coal and oil in age-long processes have both been formed from vegetable matter. All wood, coal, and oil contain the same elemental combustible materials; these elements are, however, combined in different ratios. A typical ultimate analysis of wood is as follows:

	Per Cent
Carbon	50.31
Hydrogen	6.20
Oxygen	43.08
Nitrogen	0.04
Ash	0.37

Through the ages, during which coal and oil have been subjected to heat and pressure, much of the oxygen and moisture originally contained in the wood or other cellulose matter from which they were formed have been driven off, leaving a greater concentration of combustibles.

Nearly 45 per cent of the dry weight of wood, independent of the species, is oxygen. The hydrogen-to-carbon ratio in wood is of the same order as in oil and, therefore, for the same excess air, the percentage of water vapor as compared to dry gases will be approximately the same for these two fuels. Coals, as a rule, have much lower hydrogen-to-carbon ratios and, therefore, give combustion gases containing lower percentages of moisture. The heating value of the fixed carbon in wood fuel amounts to from 15 to 20 per cent of the total heat in the fuel. The high moisture and volatile contents of hog fuel delay combustion which proceeds as follows:

1. The driving off of the moisture content and raising the wood to a temperature at which volatiles will be driven off;
2. The actual distillation of volatiles;
3. The combustion of the fixed carbon.

The high oxygen content of wood with its low nitrogen content reduces the percentage of nitrogen in hog-fuel flue gas. Coal of typical analysis, if completely burned without excess air, would produce 18½ per cent CO_2 in the combustion gases; similarly, oil of typical analysis, if burned without excess air, would produce 15½ per cent CO_2; wood of the typical analysis quoted will give, if completely burned without excess air, approximately 20 per cent CO_2.

The wood itself contains but little noncombustible in the form of ash; however, hog fuel as normally fired may carry with it appreciable quantities of ash-forming material in the nature of extraneous matter embedded in the bark or wood fibers and not removed in preparation, transportation, and handling. This may consist of small pebbles, sand, and shells. Logs which have been transported in salt water give off gases containing salt fume which assists in lowering the fusion temperature of the noncombustible and accelerates the deposit of slag on boiler tubes.

With deep fuel beds, most of the fixed carbon, undoubtedly, leaves the fuel bed as carbon monoxide where it unites with additional oxygen to burn to the dioxide. The incandescent carbon adjacent to the grates burns to the dioxide and then, in passing further through the incandescent carbon, is reduced to the monoxide.

In the cellular type of furnace, it is important to provide secondary or overdraft air. The conical pile of fuel is too thick, except around its edges, to pass the necessary air for rapid combustion. The closing of

secondary-air admission ports, resulting from too thick a fuel bed, is quickly evident in the smoking of furnaces. The admission of overdraft air through the grates in the front of the furnace with little resistance to the passage of such air decreases the negative pressure in the furnace and lowers the required average draft throughout the setting. Any decrease in required draft is desirable to avoid infiltration in the convection sections where excess air decreases the efficiency of the boiler.

The standard method of feeding fuel to flat-grate cellular-type furnaces is through feedhole openings located in the furnace roof, the fuel being transported to the furnace through chutes. Reasonable precautions are necessary to limit the amount of air entering the furnace through these chutes; any air so admitted decreases the air to the preheater and also results in furnace stratification. In spite of such precautions, the falling fuel produces an injector action and entrains considerable quantities of air.

Design of Furnaces to Burn Hog Fuel

● The problems of proper combustion of hog fuel are greatly increased by the necessity of providing furnaces suitably designed for fuels varying in size from dust to pieces having 3 to 5 cu. in. of content and for fuels of variable moisture content. Frequently, slugs of dry and highly combustible fuel are followed by slugs of wet fuel which form a damp blanket on the fuel pile. In the case of hopper-fired sloping-grate furnaces, one side of a hopper may contain dry fuel and the other side wet fuel.

The designer must provide furnaces to handle properly the wet fuel and, at the same time, not to punish unduly refractories during the periods in which only dry fuel is fed. To produce the best average combustion conditions, much study has been given to the use of sloping-grate furnaces where the fuel is admitted in a comparatively thin and uniform layer over a drying hearth, in which portion of the furnace reflected heat is utilized to drive off the moisture and start the distillation process necessary before the fixed-carbon content of the fuel can be ignited. Following this section of the furnace, the fuel flows over grates and, as the volatile content is driven off, combustion of the fixed carbon is maintained by the air passing through the grates and fuel bed.

Theoretically, such furnaces would be preferred to flat-grate, conical-pile furnaces with which by far the greatest number of hog-fuel-fired boilers are equipped. Practically, difficulties are encountered with sloping-grate furnaces caused by:

1. The fuel not being uniform in size and, therefore, containing streaks, or pockets, of greater density than adjacent areas, leading to the formation of blowholes through the fuel.

2. The fuel, not being of uniform moisture content, leads to the formation of areas in which distillation and ignition proceed more rapidly than in the adjacent areas, thus resulting in the same formation of blowholes.

With a fuel as light as wood, particularly after the moisture and volatiles have been driven off, leaving charcoal cinders, these blowholes lift the cinders from the grates, depositing them at the foot of the sloping section and, in their formation, prevent the fuel from above the blowhole cascading to cover the hole. If too great ashpit pressures are used, this formation of blowholes is accentuated.

The accumulated charcoal cinders at the toe of the sloping grates afford such high resistance to the passage of air that insufficient air passes through this material. This prevents the combustion at the toe of the grate proceeding with sufficient rapidity to obtain high ratings per square foot of grate area, as the limiting rate for inflow of fuel over the drying-hearth section is the rate at which the fixed carbon can be consumed at the lower end of the grate. Even though sloping-grate furnaces have been tried in the Northwest with 15 to 16 ft. of total length, obtainable capacities per foot of width of furnace have been less than those possible with well-designed furnaces of the so-called cellular type. As a result of the greater capacity obtainable in the latter furnace, most of the installations made in recent years have been of this design.

It is possible that extremely long sloping furnaces with special means for controlling the rate of feed and for cleaning the accumulated slag at the toe of the grate, with controlled and zoned air supply, could be developed to give results comparable with those obtained with a flat surface. Such an installation would involve capital expenditures which do not appear to be commercially justified, as they could not improve materially upon the efficiencies obtained with the present flat cellular-type furnace. An advantage of the cellular type of furnace is the ability to operate a boiler at reduced rating while burning down and cleaning the slag from the grates in one of the multiple cells. Cell-type furnaces are constructed with widths for individual cells ranging from 6½ to 8½ ft., which appear to be the economical limits of conical piles to be covered by single feedholes.

The combustion-chamber volume, gas-travel length before convection surfaces, and the cross-sectional area of combustion space are related and important in hog-fuel combustion. In comparable installations, the gas weights with hog fuel are approximately 1.7 times the gas weights with oil, and approximately 1.25 times the gas weights with coal. This increased gas weight results in lower combustion-chamber temperatures which are further reduced by the high moisture content of the hog-fuel gases. The decreased temperature does not entirely offset the increased gas weights and larger cross-sectional areas are required when burning hog fuel to give comparable velocities in the combustion space. These factors make it essential to provide larger combustion spaces with hog fuel than with other fuels.

With the modern boiler installation, the increased capacity obtainable with preheated air has been largely responsible for the installation of preheaters rather than any gain in efficiency resulting from their use. When a preheater installation is charged with the extra capital, operating, and power costs, made necessary by the installation of forced and induced-draft fans, and the necessary gas and air ducts, the low cost per Btu of the fuel precludes the justification of air preheaters on a strictly fuel-saving basis. With hog fuel it is impossible to obtain as low exit-gas temperature from air preheaters as with other fuels. The high exit-gas temperatures, in part, result from the fact that only 75 to 80 per cent of the air required for combustion can be passed through the air preheater.

With the general introduction of water-cooled combustion chambers in an endeavor to reduce brickwork maintenance, the addition of the preheater has been found desirable in order to decrease the size of the combustion chamber and the length of gas travel necessary from the furnaces to the convection surfaces.

The use of preheaters has made it necessary to use water-cooled grates to avoid excessive grate maintenance. Water-cooled grates have

also proved desirable to facilitate grate cleaning. The slag formed from the foreign matter brought in with the fuel does not adhere tenaciously to the water-cooled grates; whereas, with uncooled grates, it is removed with difficulty. Several designs of water-cooled grates have been developed for this service. The heat absorbed in the cooling water is low-potential heat and must be subtracted from the heat available for the production of steam. In many installations the heat obtained in grate-cooling water is used to heat condensate, or make-up water, in this manner supplanting heat which would otherwise be supplied by bled steam which had produced power or by the exhaust from noncondensing auxiliaries. It is, therefore, important in the design and construction of water-cooled grates to provide an arrangement for cooling which will extend the life of the grate, provide for easy cleaning, and, at the same time, extract from the grates and from the preheated air passing through them a minimum amount of this low-potential heat.

Driers

● Hog-fuel driers offer attractive potential savings to the power-plant operator. The flue gas leaving an air heater at approximately 500 F. contains sufficient heat to remove about ½ lb. of water per lb. of dry wood without dropping the temperature of the gas so low that condensation difficulties will arise. In addition to the savings, the drying of hog fuel gives considerably increased capacity per square foot of grate.

Although hog-fuel driers seemingly have a broad field, the volume of fuel to be dried per available Btu makes necessary a drier of such large physical dimensions that the fixed charges and the operating and maintenance expenses make it difficult to justify the investment.

Several different types of hog-fuel driers have been proposed and tried in this country and abroad, but the authors do not know of any design which has proved completely satisfactory. There is a definite field for a satisfactory hog-feul drier, but until all of the mechanical difficulties with the prevailing designs can be successfully solved their use will not become extensive.

Cinder Nuisance

● The cinder nuisance from hog-fuel-burning plants has increased with higher firing rates required in the modern high-duty boilers equipped with forced and induced-draft fans and air preheaters. Modern hog-fuel-burning plants are providing either mechanical separators or flue-gas washers for cinder removal. Starting with the use of large single cyclone dust separators, with relatively poor efficiencies on the fine light cinder particles, the necessity of securing better cinder elmination has led to a trial of various designs of mechanical devices, and to the development of special wet gas washers.

There is but little information available concerning the dust loadings of boiler-exit gases. At recent biddings by prominent boiler manufacturers, great divergence in the assumed percentages of unconsumed combustible showed that there was apparently no actual knowledge of the dust loadings to be expected. Bidders allowed as low as 0.25 per cent unconsumed combustible loss, while others allowed as much as 7.5 per cent. Some bidders gave constant percentages over the entire range of ratings, although it is evident that the unconsumed-carbon loss in the flue gas will increase with the rate of firing.

Recently, extensive and carefully conducted tests have been made by one of the country's foremost manufacturers of gas-cleansing equipment. Tests were made at various rates of operation, with and without preheat on distinctly different types of boilers. These tests will give the first authentic data on the dust loadings in flue gases of hog-fuel-fired boilers under variable conditions of firing, fuel and rating. Unfortunately, this information is not as yet available to the public. The cinder problem when burning hog-fuel at high firing rates is a real one. The industry may expect valuable information affecting the best means of cinder collection from such tests and the developments resulting therefrom.

Boiler Capacities

● A high and narrow boiler is less expensive than a low and wide one of equal heating surface. The problems of boiler-plant design are not so much the provision of heat-absorbing surface as in obtaining suitable furnaces for combustion of the wet fuels at high rates per unit area of furnaces. Tandem furnaces do not operate as well as furnaces with a single feedhole per cell. Any boiler should have a minimum of two cells to permit carrying part load during grate-cleaning periods, while three cells permit carrying greater loads during such periods. Boiler plants with several boiler units can use fewer cells per unit without material loss of plant capacity. Many installations have furnaces splayed to a greater over-all width than the boiler to permit greater furnace capacity with narrow boilers.

Numerous factors affect the capacity obtained from hog-fuel-fired boilers. The following table is intended to indicate in a general way what capacity should be expected from a well-designed furnace cell of the general dimensions used in modern installations in the Northwest. Values are given for cells with and without preheat and with good fuels of different moisture content:

Moisture in fuel, per cent	Btu input per sq. ft. of grate area	
	Without preheat	With preheat
40	680000	850000
48	550000	690000
56	400000	500000

Caution should be exercised in the use of the capacities tabulated as they reflect what can be accomplished under good conditions and in properly designed furnaces.

Otto Erickson Retires After 51 Years

● Otto Erickson, 71, has retired from active employment after working for the Crown Willamette Paper Company, Division of Crown Zellerbach Corp., at West Linn for 51 years and three months. He entered the employment of the West Linn plant on August 15, 1889, as a carpenter at $2.50 per day. Later he changed to the job of millwright, the position he has since held for 50 years.

On August 15, 1939, Erickson was presented with a diamond-studded service pin of the Crown Zellerbach Corporation by Louis Bloch, chairman of the board.

West Linn's 35-Year Club

● The 35-Year Club of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at West Linn, Oregon, now has 22 members. At a meeting on December 12th prior to the service pin dinner at which 80 employees of West Linn received service pins, four new members were taken in, John Bolle, Hugh Matheson, Louis Bloch and Franklin T. Griffith.

Clarence Bruner, resident manager of the West Linn mill, was elected president for 1941.

The following are members of the 35-Year Club, having served 35 years or more: Charles Barry, C. A. Baxter, John Bolle, C. E. Bruner.

Charles Croner, Frank Driskell, Otto Erickson, Ed Fredericks, Frank Hammerle, Elmer Hendrickson, George Howell, Ira Lytsell.

Hugh Matheson, Lake May, William Peters, G. E. Reddick, Claude Rittenhouse, Ivan Rittenhouse, F. D. Simmons, Henry E. Van Wey, Louis Bloch and Franklin T. Griffith.

Cellulose As Fodder

by KNUT BREIREM*

TRANSLATED BY JOHN ENGH

The stoppage of imports of fodder into Norway and Sweden by the blockade of the Baltic, has revived experiments with wood cellulose as a cattle food.

Data on these experiments are of interest to American and Canadian pulp men, not as a practical measure today in their own countries, but as an example of the potential contribution wood cellulose can make to the national welfare in an emergency.

AS early as the 1890's experiments were carried on in Germany (Lehmann, Kellner) with dissolving of straw by the methods used in the paper industry. It was shown that this gave exceptionally good results as far as feeding was concerned. While the organic material in straw is digested to the extent of 40-45 per cent by ruminants, the digestibility rose to 85-90 per cent for straw cellulose made by cooking with caustic soda. Furthermore, Kellner's well known experiment showed that in fattening of cattle, just as much fat was produced from cellulose as from digestible starch. That is to say that digestible starch and digestible cellulose have the same nutrition value.

That the cooking of straw increases its nutrition value depends on the fact that the bond between the cellulose and lignin is loosened whereby lignin is dissolved and partly removed. The low digestibility of the natural straw is due to the cellulose being incrustated with a hard to dissolve matter, generally included under the term lignin.

It is not possible to increase the nutrition value of lignified cellulose by mechanical grinding. Straw flour thus is not digested any better than whole straw. It is shown, moreover, that mechanical wood pulp cannot be used as fodder. Wood cellulose made by dissolving in caustic soda or by use of the sulphite or sulphate methods has, on the other hand, great nutrition value. The digestibility of organic matter in well dissolved wood cellulose reaches about 90 per cent, or the same as for straw cellulose. One can further assume that the utilization of the digestible cellulose is equally as good whether the cellulose is made from straw or wood. That this is the case is confirmed by the many practical feeding experiments in which other fodder has been substituted with cellulose in proportion to the assumed fodder value.

The greater part of the experiments have been conducted on dairy animals, and it has been found that the milk production is kept up well, granted that the cellulose is included in a well-balanced feed ration. Cellulose can also be used for horses with good results when moderate amounts are used. Excellent results are also obtained using cellulose for young animals, especially steers. According to Kellner's aforementioned experiment it is but reasonable that cellulose is a valuable fodder for fattening animals. Also for sheep the cellulose is a good fodder. This fact can be taken advantage of when it is necessary to keep a large flock of sheep over the winter, to utilize the pasture better.

For hogs and poultry, however, cellulose is little fitted as feed. This is deplorable, as it is just these animals which are most dependent on the imported carbohydrate feed. Thus, one cannot expect to keep egg and pork production up during the present crisis by the feeding of cellulose.

The Biological Conditions in Utilization of Cellulose

● To understand that the cellulose has a high nutrition value, and that the value varies with the different animals, it is necessary to go into the biological conditions in the utilization of cellulose. Those nutriments which the animals absorb cannot be used directly in their organisms. During the digestion process they must be broken down to simple substances which can be absorbed through the intestinal walls and transported in the blood to the different cells in the organism. The chemical reactions taking place in the organism by the absorbed substances are covered under the term metabolism. As an example, starch is broken down into dextrose in the digestive tract and subsequently the dextrose is absorbed and used in the metabolism. The breaking down of the starch in the digestive tract is accomplished by the help of enzymes. Cellulose, on the other hand, cannot be broken down by enzymes, as among the higher animals no cellulose attacking enzymes exist. When the cellulose still can be digested and utilized by the animals, this is due to bacteria. The greatest bacteria activity is found in cattle and other ruminants (sheep and goats), and it is therefore reasonable to assume that it is the ruminants which have the best prerequisites for utilization of cellulose.

Also horses and hogs have enough bacteria activity in the digestive tract to digest the cellulose well. For straw cellulose there are examples showing that the digestibility of the organic matter can get up to 85-90 per cent, both in horses and hogs.

The utilization of the digestible cellulose is dependent on the products which are produced by the bacteria digestion. The general belief is that the principal products are acetic acid and butyric acid, and it is then scarcely probable that the digestible cellulose will be utilized to the extent of the starch, which is broken down into dextrose by the enzymes. The Englishman, Woodman, has proved, however, that in bacteria digestion dextrose, pyrosaccharic acid and lactic acid are produced, and only lesser amounts of acetic acid and butyric acid. As pyro-saccharic acid is an intermediate link in the chemical reactions which take place when dextrose produces fat, it is quite probable that cellulose produces fat, even if one would expect the fat production from cellulose to be less than from starch.

Experiments by the German, Fingerling, showed that digestible cellulose formed only 70 per cent as much fat as digestible starch in fattening of hogs. Even if hogs digest the dissolved cellulose just as well as cattle it is evident that the nutrition value is considerably less in hogs than in cattle. The reason for

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cellulose having so much less value than starch in hogs than in cattle is, however that hogs utilize the starch better than cattle do. One kilogram of digestible cellulose produces the same amount of calories in fat in cattle and hogs while, on the other hand, 1 kg. digestible starch produces more calories in hogs than in cattle, as the figures below show (Kellner and Fingerling):

	Cattle calories	Hogs calories
1 kg. digestible starch	2,350	3,360
1 kg. digestible cellulose	2,390	2,350

Fingerling explains this by stating that both starch and cellulose is digested by bacteria in cattle, whereby the starch cannot attain its full value in cattle. In hogs the starch is digested by enzymes and the cellulose by bacteria, and the cellulose thereby attains a lesser value in comparison to starch than in cattle. The explanation is in accord with what one would expect theoretically, namely, that a carbohydrate that is broken down into dextrose by enzymes should be utilized to a better extent than carbohydrates broken down into organic acids by bacteria.

To understand the full extent of these results one must bear in mind that the nutrition values of the fodder substances are valued in comparison with each other. In ruminants well dissolved cellulose will have the same value as the starch in the usual fodder substances rich in starch, such as for instance grain and potatoes. When applied to hogs, on the other hand, the cellulose will have less value than starchy fodder substances. The consequence of this is therefore that for hogs a larger amount of cellulose is needed per feed unit (f.u.) than for cattle.

What the proportion is for horses is still not quite clear. It is probable that also for horses a somewhat larger amount of cellulose per feed unit is needed than for ruminants. On the other hand, the conditions for bacteria activity in the digestive tract in horses is so favorable that one may expect that horses occupy an intermediate position between ruminants and hogs.

If wood products are to be used for production of fodder for hogs it is necessary to produce wood sugar which is a full-value fodder for hogs, as the sugar is broken down by enzymes. To make products between cellulose and sugar is of no particular interest (Mangold), as these substances must be broken down by bacteria, whereby the value will be no higher than for cellulose. The production of wood sugar for fodder, however, is too expensive to be of practical value under the present crisis.

The Properties of Cellulose As Fodder

● As already mentioned, a high degree of digestibility of the cellulose can be counted with. For a well cooked cellulose a digestibility of 80-90 per cent is attained. This is a digestibility which is equal to the digestibility of the best kinds of patent feeds.

The nutrition value of cellulose, expressed in feed units, is, however, not precisely determined. At the present we use a value of about 85 feed units per 100 kg. dry cellulose. That is to say, that it take 1.2 kg. dry cellulose (90 per cent dry matter) to 1 feed unit. This value corresponds in the main to practical experiments, which are uncertain when it comes to determining the feed unit value. It is only by respiration experiments that the nutrition value can be determined with certainty. Unfortunately, in Norway we lack the necessary equipment to carry out these experiments.

It is not improbable that the feed unit value of cellulose is greater than mentioned above when applied to ruminants. With a digestibility of about 90 per cent for organic matter the same feed unit value as for corn and manioka-flour can reasonably be expected. However, consideration must be given to the fact that ordinary cellulose evidently necessitates a somewhat higher expenditure of energy on chewing and digestion than does patent feeds. For the time being, it is therefore uncertain whether the feed unit value can be set higher than 85 per 100 kg. dry cellulose. It can thus be mentioned that Fingerling assumes a value of 95 feed units per 100 kg. for a well dissolved straw cellulose, 87 per cent digestibility of the carbohydrates. Care ought, on the whole, be exercised not to introduce an essentially more favorable evaluation of the cellulose feed unit value than that used at present, owing to the fact that the cellulose, in contrast to patent feeds, are a comparatively filling fodder. This creates difficulties when cellulose is to be fed together with large amounts of straw fodder and silage. The animals can take large amounts of ordinary patent feeds even if they get much straw fodder. If they are to take essentially large amounts of cellulose, on the other hand, it is often necessary to limit the amount of straw fodder; a way out which is of little help if big harvest of hay is obtained.

Cellulose can therefore not be regarded as an equal substitute for patent feed, in spite of the cellulose's high digestibility and feed unit value. However, with limited access to straw fodder the cellulose becomes a valuable feed and a good substitute for patent feed.

In practice it is often difficult to get the animals to take cellulose. It then becomes necessary to take time and patience, and sometimes less feed must be given while getting them used to cellulose. In dairy animals a lowering of the milk production is risked if the amount of feed is curtailed, and it is therefore important to get the animals used to cellulose before calfing. To get the animals accustomed to cellulose goes easier if they get a little molasses to start with. After they have become accustomed to cellulose they take it very easy, often even better than hay. For horses it is necessary, or at least desirable, to fine-grind the cellulose. Horses have namely a short eating time, and have difficulties chewing the sheets.

The cellulose is a simple carbohydrate fodder. In one way it can be compared to sugar in human nutrition. To get a good yield from cellulose feeding it is necessary to supply the nutrition matter which the cellulose lacks. It is especially important to supply protein. When we in Norway are expecting such good results from feeding of cellulose to dairy animals it is because we can easily obtain the necessary protein in fish products, especially herring meal. As the Director of Agriculture has said, agriculture is counting on support from the forestry and fisheries when it comes to finding a substitute for the imported patent feed.

Besides protein, the cellulose also lacks minerals and vitamins. Minerals can partly by supplied in the herring meal used to supply protein, and to this more minerals can be added as needed. Vitamins are plentifully supplied if the animals get a reasonable amount of hay and silage (A.I.V. fodder) in addition to the cellulose.

With a sensibly compounded feeding, it should thus be easy to correct the shortcomings of the cellulose, and good results can then be expected from cellulose feeding. This goes for both ruminants and horses.

The Economy of Cellulose Feeding

● The technical conditions concerning cellulose feeding are quite well worked over, even though there still are questions remaining which need further study and research. However, it is far more important to solve the question of price on feed cellulose. The prices now asked for cellulose are so high in comparison with the imported carbohydrate fodder that it is unprofitable to feed with cellulose.

The question of cellulose feeding is of such interest here in Norway, because we have a shortage of carbohydrate feed for our livestock. We can expect that this will continue to be the case for still some time, as we have little arable land and a large number of animals in comparison to the area. It is especially on the small farms that the lack of proper feed is evident. The lacking carbohydrates must be supplied by import of patent feed, or the production of patent feed from wood products, i. e. cellulose and wood sugar. Under normal conditions it is more profitable for agriculture to import patent feed. When the import falls off, as now, it is of importance to obtain a substitute for the patent feed. Here the cellulose can be of real help in the feeding of those animals that utilize the cellulose well (cattle and horses). If agriculture is to use cellulose it is, however, necessary that the price gets down to the same level as for other feeds. It can also be brought about by a raise in prices on dairy products to where the raise in production cost as a result of cellulose feeding is compensated for.

It can not be expected that agriculture will make use of cellulose as feed if it is to cut into the profits. The majority of farmers will rather cut down the number of animals or try to substitute for the patent feed by increasing their own feed crops. Agriculture has namely great possibilities for increased carbohydrate production by expansion of beet and potato growing. Feed products can thereby be supplied which, as feed, is superior to cellulose and at the same time comparatively inexpensive. Even if we assume an increase in beet and potato growing, there will still be a demand for cellulose as fodder. It is therefore of great importance that the question of price of cellulose is solved so that the cellulose feeding becomes economically possible. Both the logging and pulp industry are interested in the matter and it is, besides, an important matter of supply of interest to the whole commonwealth.

The price of carbohydrate feed can be figured at 20-22 ore (5-5½c) per feed unit. Using the figure of 1.2 kg. dry cellulose (90 per cent dry matter) per 1 f.u., the comparative price for cellulose will be 17-18 ore (4¼-4½c) per kg. ($42.50-45.00) per ton. If the food value of the cellulose was higher, say 1-1.1 kg. per f.u., the price of cellulose could be set at about 20 ore (5c) per kg. This is the price which agriculture can pay. However, transportation and handling costs amounts to about 4 ore (1c) per kg. and the price at the mill will therefore be only about kr. 140 ($35) per ton—a price far below the present manufacturing cost of cellulose. One will understand from this that it is no easy matter to solve the economic side of the question of cellulose feeding. It is therefore doubtful if one can escape state subsidy or an increase in prices for dairy products if feeding with cellulose is to be undertaken to any degree.

Here, however, another important question presents itself; namely, whether it is possible to manufacture the cellulose cheaper by using cheaper wood or by increasing the yield of cellulose by less cooking. Following the initiative of Dr. Samuelson, research into these questions has been started. The requirements of a feed cellulose are namely less than of paper making cellulose. The main requirement of feed cellulose is that it has a high digestibility, preferably over 80 per cent for the organic matter. To obtain this digestibility the cellulose must be cooked until the lignin content is brought down to a certain limit, which we as yet do not have enough data to determine. Besides this, we demand of a good feed cellulose that it shall have the right physical composition, i. e., that it shall be as porous as possible and easily hydrated. Hard-pressed cellulose is hardly usable as it is tough and hard, making the animals reluctant to take it. In their experiments, Dr. Samuelson and Engineer Loschbrandt made a cellulose of specially good physical characteristics but this, unfortunately, can apparently not be made at the mills.

The color of the cellulose is of no importance, and the barking of the logs can therefore be dispensed with in the manufacture of feed cellulose.

When it is said that cellulose cannot be manufactured for a lower price than Kr. 230-270 ($57.50-67.50) per ton, this is partly because of the increasing prices of wood, coal and other operating materials. Dr. Samuelsen has calculated that under pre-war conditions, and with low wood prices, the cellulose could be made for Kr. 155-170 ($38.75-42.50) per ton. If, by using cheaper wood and cheaper methods that give a bigger yield, the production price can be pushed down to Kr. 120-150 ($30.00-37.50) per ton it will be possible to use cellulose as fodder, even under normal conditions. This would be a gain, national-economically, especially if materials can be utilized which cannot be better utilized in any other manner.

● In connection with the use of wood cellulose for fodder in the Scandinavian countries, The SWEDISH WOOD PULP JOURNAL had the following to say in the issue of November 30, 1940:

"The use of cellulose as food for cattle is being intensely studied in the three Scandinavian countries as well as in Germany, and although different paths are followed, positive results seem to have been obtained in them all. It is a both scientifically and practically established fact that cellulose may with great advantage be used for feeding animals, especially horses and cattle. What is limiting a heavy increase of the consumption of cellulose for this purpose is partly the cost, and partly the supply of supplementary feeding stuffs, such as soy-meal and molasses, to balance the nutritive qualities of cellulose and to make it more palatable to the animals. Some experiments in Norway have indicated that the meat of animals fed on cellulose is at least as good, and sometimes better, than the meat of those fed on ordinary feeding stuffs. In Germany a method of preparing cellulose meal to make it more easily assimilated and more nourishing has been worked out. Further improvements of the methods, and a cheapening of the costs, would obviously mean a considerably increased scope for cellulose for this purpose. Whether cellulose feeds will this time prove anything but a temporary expedient to be resorted to in times of crisis remains to be seen, but the experiences of the present methods of manufacture and feeding are considerably more favorable than during the last war."

The experiments which have been carried out with different cellulose, in collaboration with Dr. Samuelsen and Engineer Loschbrandt at the Paper Industry's Research Institute and my assistant, Hvidsten, at the Agricultural College, have not, as yet, reached the stage where the results can be released. I shall, however, mention some preliminary results here:

Preliminary Results	Per cent Lignin	Digestibility Organic Matter
Hard Pressed Mill Pulp	----	88
Kollergang-ground Mill Pulp	----	91
Loosely Pressed Mill Pulp	1.5	87
Spruce (Thinning Material) A	5.7	87
Spruce Branches B	14.2	75

The mill pulp has been digested with 87-91 per cent which is fully satisfactory. The most interesting fact is that the same digestibility has been obtained for thinning-out material with bark (small diameter trees), in spite of a lignin content of about four times that of mill pulp. It should therefore be possible to use this comparatively inexpensive material for production of feed cellulose.

The cellulose from spruce branches, with a lignin content of 14.2 per cent, is digested with only 75 per cent. Even if this is a high digestibility, it doesn't cover the requirements of a good feed cellulose. However, this is of minor importance as, according to Professor Eide, it will hardly be possible to transport spruce branches to the pulp mills.

In the experiments are also included alder and an extra quality of thinning-out material, but these experiments have not progressed to where we can publish any results. Neither have we had time to make experiments with sulphate pulp as yet, but have gotten some started. According to Swedish experiments (Edin) the sulphate cellulose has equally as high feed value as sulphite. The sulphate cellulose is cheaper to make, but the sulphite cellulose has the advantage of being produceable entirely from Norwegian chemicals.

NOTE: The expression "Patent-Feed," occurring in several places throughout the article, is the closest possible translation into English of "Kraft-for," which is any one of several brands of specially prepared and sacked feed for health and greater production.

News of the Swedish Pulp and Paper Industry

● In the October 31, 1940, issue of The Swedish Wood Pulp Journal appeared the following interesting news items:

Munksjo A. B., Jonkoping, celebrated the 50th anniversary of its founding. The mill started work in 1862, and in 1890 was made into a limited company with a share capital of 700,000 kronor. This has gradually grown to 15 million kronor, and the plant has expanded tremendously. From relative small initial quantities, the output at the Munksjo mill alone has grown to 30,000 tons of paper, 7,500 tons of cardboard, and 15,000 tons of sulphite pulp, while 50,000 tons of sulphate pulp are made at Aspa and Stodstorp mills.

The Billerud Rayon Pulp Mills are working full time in spite of everything, and have orders in hand at least up to the end of the year. The same applies to the Gruvon kraft paper mill, but the greaseproof mill at Saffle is worse off. The manufacture of cellulose for cattle food has instead been taken up there.

Of the Kramfors A. B. mills, work is proceeding at Kramfors and Frano, while Nensjo and Ulvvik are standing still. The time when they can be restarted will depend upon shipments. Kramfors is at present manufacturing 4,000 tons of cellulose for cattle food on a new method invented by the company's chief chemist, Dr. David Johanson.

Work at the Svano cellulose mill will be resumed early in November in order to make 2,000 tons of cattle food.

The Waija Paper Mill has begun to make special sacks for producer-gas charcoal and wood, with an output of 10,000 sacks a day. This will provide work for 30 new hands (women).

Works at the Munksund sulphate mill was resumed on October 28th.

Bolt sleeves of paper. A. B. Billinsfors-Langed has taken up the manufacture of bolt sleeves made of paper. These sleeves can be supplied impregnated or unimpregnated in sizes varying from 15 mm. to 150 mm. internal diameter and of standard lengths, but they can also be obtained in any lengths up to 7 meters. They are being widely used in the building trade.

Grants for new alcohol factories. On the proposal of Vin & Spritcentralen, the Fuel and Industry Commission have jointly applied for a further grant of 5 mill. kr. for building new alcohol factories.

Five millions have been granted earlier, of which 4,75 have been used as follows:

Sulphite alcohol factory	Capacity Mill. Litres	Mill. Kr.
At Mo	5	1,5
At Hornefors	2,7	1,25
At Ortviken	2,5	1,40
At Bengtsfors	1,1	0,60

The completion of the new factories will increase the normal total output capacity from 45 to 56,3 mill. litres. To this should be added the planned production of the Korsnas factory.

Seeing that of the original grant of 5 mill. kr. only 0,25 mill. are not allotted, and that more new factories are proposed, it has been considered advisable to allot another 5 mill. kr. for this purpose.

New paper organizations. At a meeting in Stockholm in October last representatives of Swedish, Norwegian, and Finnish manufacturers of fine paper and cardboard resolved to form two new organizations, to be called "Scanfin" and "Scanpapp." The offices of both will be at 2, Norrmalmstorg, Stockholm.

"Scanfin" will be an association of Scandinavian fine paper mills, and Mr. K. Lindskog has been appointed its secretary.

Mr. Lindskog has been working in Japan, America, and Norway, besides in a number of Swedish firms. His last appointment was with the Stockholm agency of the Association of Finnish Paper Mills.

"Scanpapp" is a like association of cardboard makers; Captain Nils Palme has been appointed its secretary, but will retain his post as secretary to Scankraft.

Mr. Th. Ihre, the secretary to Scangreaseproof, has been appointed temp. secretary to Scansulfit.

The new offices at 2, Norrmalmstorg, will thus be jointly occupied by all the Scandinavian paper organizations except Scannews, viz.: Scankraft Scangreaseproof, Scanfin, and Scanpapp.

New Director of the Paper Mills Association. The Association of Swedish Paper Mills has appointed its former assistant director, Mr. Ludvig Lundqvist, managing director succeeding the late Mr. Frederic Jahn. Mr. Lundqvist was also appointed managing director of the Swedish Paper Journal.

The new director was born in 1899 and graduated from the Stockholm School of Economics in 1924, after which he worked abroad for some time. Since his return, he has held appointments in the Ford Concern and in A.-B. Wiklunds Maskin- och Velocipedfabrik in Stockholm, leaving the latter firm in 1932 to become secretary to the Association of Swedish Paper Mills, and was appointed its assistant director some time ago.

Cellulose for Cattle Food. The first consignments of cellulose for cattle food, made by our cellulose mills in cooperation with A.-B. Svensk Sprit and the Provisions and Fuel Commissions, have been sent to Gotland. The price is about 18;—kr. per 100 kg., which from the point of view of nutritive value is considered cheap, as the cattle can assimilate some 85 or 90 per cent of the pulp. The nutritive value of cellulose is considered to equal that of oats.

Production of pine oil. The two sulphate mills in this country manufacturing pine oil, Marmaverken and Sandarna, have increased their annual production to about 3,500 tons p. a. by purchasing liquid resin from other mills.

Mr. Gunnar Reinius of the Industry Commission informs us that by this increase it is possible to meet half our requirements of soft soap, which has been taken into account in fixing the rations.

Norway

The Notodden Artificial Silk Mill will, owing to the increasing demand for artificial silk, increase its production from 175 tons to about 500 tons by the installation of two new spinning machines.

Follums Traesliperi is to manufacture 4,500 tons of cellulose for cattle food, and so will Union Bruk, though the output there is not yet fixed, and Hunsfoss Fabrikker, which will produce 6,000 tons.

The Toten Cellulose Mill, which has announced its pending closing down, will continue working, and so will Lands Traesliperi.

Ulefos Traesliperi will shortly begin working. The sawmill is working full time.

British Columbia Pulp & Paper Production Up Last Year

● British Columbia's pulp and paper industry rolled up impressive production records in 1940, according to the incomplete records so far available. It is expected that value and volume of the output will be about 20 per cent higher than the record of the previous year when all the figures are in.

According to company estimates, Powell River Company produced about 200,000 tons of newsprint last year, and Pacific Mills, Ltd., about 70,000 tons. This represents a gross revenue of $13,500,000 on the basis of $50 per ton, which was the basic price for the period.

A true calculation of pulp manufactures is more difficult to make as only one company in the province manufactures pulp exclusively, and figures for the other companies sometimes overlap those representing production of newsprint. However, British Columbia Pulp & Paper Company, which manufactures bleached sulphite and rayon pulp exclusively at its mills in Port Alice and Woodfibre, estimates production of about 100,000 tons. Pulp prices have been more variable than those for newsprint and it is almost impossible to fix an average valuation on the year's production.

Powell River Company has gone more extensively into the production of unbleached sulphite pulp—a departure from the policy pursued up till a couple of years ago, when newsprint alone was Powell River's product. It is expected that Powell River Company will continue to expand its pulp manufacture in view of the prevailing demand and the curtailment of unbleached pulp production in the British Columbia Pulp & Paper Company's mills.

Considering newsprint output alone, British Columbia last year exceeded the ten-year average in value of pulp and paper manufacture—$13,000,000. The all-time high was in 1937, when B. C. mills produced pulp and paper to the value of $17.2 millions. The year 1938 saw a falling off to $11.2 million and 1939 began to show the effects of the wartime demand with a production value of $16.9 million.

In 1939 the British Columbia newsprint companies were producing at a lower rate than in 1940—Pacific Mills' newsprint production was about 20 per cent less, and British Columbia Pulp & Paper Company's pulp mills were shut down for several months of 1939. Last year, as today, most of the pulp and paper mills in the province were operating close to capacity, with Powell River now on a 685-ton daily basis and Pacific Mills at about 220 tons. It would not be surprising to see new records established for both pulp and paper for 1940, and if present markets continue there is little doubt that this year's showing will eclipse that of 1940, for this winter Vancouver Kraft Corporation at Port Mellon, Howe Sound, has swung into production with 80 tons of kraft daily.

Another Paper Maker Arrives in Bellingham

● Mr. and Mrs. W. R. Dynes are being congratulated on the birth of a second son, James Henry Dynes. The new son in the Dyne's household was born January 9th, and will probably be a papermaker like his father who is assistant superintendent of the Pacific Coast Paper Mills of Bellingham.

Los Angeles Employees Of C-Z Receive Service Pins

● Service pins, symbols of years of loyal association with the company, were awarded to 17 members of the Crown Willamette Paper Company, Los Angeles Division of Crown Zellerbach Corporation, at a banquet January 13th.

Ninety-one attended the dinner at the Alexandria Hotel in Los Angeles. From those just entering the ranks of pin holders with newly received five-year pins, the ranks of years of service rose by five-year intervals to six holding 30-year pins, two with 35-year pins, one with a 40-year pin and the top rank, one with a 45-year pin.

William R. McHaffie, manager of the Los Angeles Division, welcomed all to the banquet and introduced the officials and guests who were present. His introductions included J. Y. Baruh, vice-president of Crown Zellerbach Corporation; Alexander R. Heron, industrial and public relations director of the Crown Zellerbach Corporation; William D. Welsh, assistant to the industrial and public relations director of the Crown Zellerbach Corporation; Walter Voltz, manager of the Western Waxed Paper Company; George Wieman, sales manager of Western Waxed Paper Company; Ralph Howe, assistant to Philo Holland, manager of the Zellerbach Paper Company, Los Angeles; Graham Whitehurst, personnel manager, Zellerbach Paper Company, Los Angeles; Charles Hulse, superintendent, Western Waxed Paper Company, and Al Bojanower, production manager, Western Waxed Paper Company.

Mr. McHaffie then turned the meeting over to Mr. Welsh, who acted as master of ceremonies. Mr. Welsh introduced Lester Remmers, sales manager of Crown Willamette Paper Company, Los Angeles Division, pointing out that he is also president of the Paper Mill Men's Club this year. Mr. Remmers noted that this was the third awards banquet held in Southern California with 67 receiving pins at the first banquet, 73 at the second and 84 in attendance at the present meeting. Pin holders he noted were in service from five to 45 years at the dinner, and the total number of years worked for the company by the pin holders was 1,060. Mr. Welsh called on Mr. Wieman for one of his excellent stories, which, the latter told with customary gusto. Mr. Welsh asked Mr. Howe to say a few words for the Zellerbach Paper Co. Mr. Howe expressed his pleasure in being there and the regrets of Mr. Holland in missing the dinner due to illness.

A motion picture was then shown prepared by Mr. Welsh and described by him as the movie was shown. The picture was in color and was an excellent picturization of the work being done in conservation and in selective logging by progressive companies in the Pacific Northwest. Activities in clearing the blowdown areas, re-seeding where possible, in the large nurseries where trees are grown from seed for planting, in replanting where clear cutting has been done, in fire protection, in the countless ways that modern forestry is now building for the future through conservation and control, while still making available sufficient crops for the uses of modern industry.

● Alexander R. Heron then gave the address of the evening. His talk stressed the importance of foresight in the management of corporations which guarantees the future for those who serve in these companies and come up each five years for service pins.

He declared a man who has given twenty years to a corporation has not given 40,000 hours, but he has given a life to that company. If he'd put money into the company, he could be bought out, but you can't give him back those twenty years. As a result he has a right to expect some one in that company to look ahead to insure the future of that concern.

"This institution must be the living thing we want it to be. We have the right to expect from management the foresight that will see it carry on. The quality of the products, physical plant improvements when needed, new products to meet changing conditions, all these things must be considered with a view to the future. And conscious of the fact that my investment of years is greater than an investment of dollars, I must protect my investment by making my contribution."

● Following Mr. Heron's address, Mr. Baruh presented the seventeen service pins. Those receiving these awards were: Vincent Lacasella, 25

years; Bob Tily, 15 years; C. H. Miller, William Bogdanov and Henry Renteria, 10 years; Louise Brunell, Marguerite Hill, Jeannette Burt, Bessie Moon, Marcelino Mesa, Albert Piers, R. E. Bright, Gene Fleming, Jerry Shahan, Frank Allison, Wilbur Tree, and Bernard Nichols (who was absent due to illness), each received a 5-year service pin.

St. Regis Installing New Machine Shop

• The St. Regis Paper Company, Kraft Pulp Division, Tacoma, is moving its machine shop to larger quarters in the old chipping plant building. This building, of steel, brick and concrete construction, has been used for storage for several years since the new chipping plant was built in connection with the breakdown plant in 1936.

A new concrete floor has been poured and the equipment will be in place shortly after the middle of this month. In addition to the machine tools the building will house the carpenters and their equipment, the pipefitters and the electrical men, the latter having a separate shop. Part of the building has been walled off and bins installed for the storage of tools and small parts.

The former machine shop which had become inadequate with the increased production of the mill, will be converted into a locker room for the men and showers will be installed for their comfort.

Raw Cotton Allotment Not Yet Made

• As of January 31st the proposed allotment of 10,000 bales of government owned raw cotton to the writing paper manufacturers under a 50 per cent subsidy, had not yet been made.

An announcement was expected any day, said the report from Washington.

The National Association of Waste Materials Dealers has vigorously opposed this proposed governmental action on the grounds that the writing paper industry has already had 1,000 bales for experimental purposes and that every manufacturer knows whether or not he can use raw cotton anyway, and further, that such action will ruin the market for cotton waste such as cuttings from manufacturers of cotton goods.

●

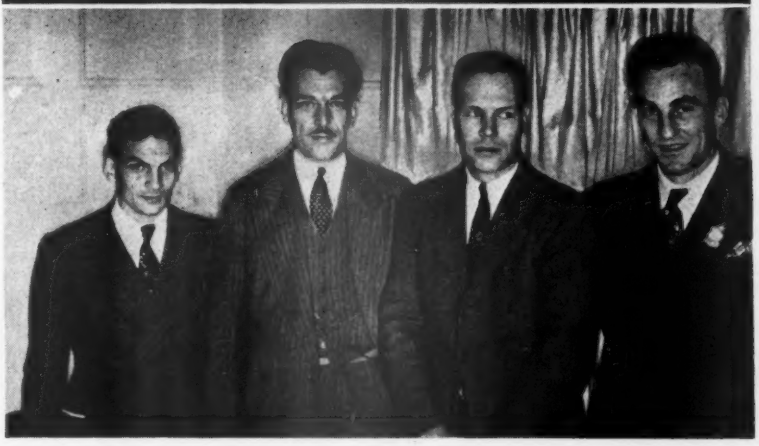
LOS ANGELES SERVICE PIN WINNERS—

In No. 1, left to right, HENRY RENTERIA, 10-year pin; MARCELINO MESA, 5-year pin; VINCENT LACASELLA, 25-year pin (Mr. Lacasella who is 41 years old, served in the World War and is a grandfather); and ALBERT PIERS, 5-year pin.

No. 2, left to right, LOUISE BRUNELL, MARGUERITE HILL, JEANETTE BURT and BESSIE MOON received 5-year pins.

No. 3, R. E. BRIGHT, 5-year pin; WILLIAM BOGDANOV, 10-year pin; and BOB TILY, 5-year pin.

No. 4, GENE FLEMING, JERRY SHAHAN, FRANK ALLISON and WILBUR TREE, received 5-year service pins.



Trade Talk

of Those Who Sell Paper in the Western States

Paper Mill Men's Club to Hold Spring Party

● The Paper Mill Men's Club of Southern California after a long winter's nap will turn out for a rousing spring meeting February 21 at the San Gabriel Country Club, San Gabriel, Calif. This is the first meeting of the new year.

C. O. "Chet" Gunther is chairman of the meeting and is being ably assisted in all preparations by G. S. Brenzel. The golfing fans of the club will meet in the early afternoon for a round on the greens. This will be followed by the usual good dinner and the evening's divertisements of indoor sports. A large turnout is anticipated.

Pell to Make Another Travelogue

● Rodman C. Pell, president of the Pelican Paper Company, San Francisco, accompanied by Mrs. Pell, will soon be off on another of his travels to interesting parts.

About April 10th they will motor to Shreveport, La., and there board a Mississippi River steamer and go down to New Orleans. From New Orleans the Pells will travel through Mississippi, Alabama, Florida, the Carolinas, Georgia, Virginia and Tennessee.

All during their travels they will be taking the colored motion pictures for which they have become famous.

When they return to San Francisco the story of their trip will be made into a travelogue entitled "Echoes of the Suwanee River."

Mr. Pell points out an interesting fact that the Suwanee River which has received so much publicity isn't an important river at all, except to the author of the song, but that really it is a small stream rising in the lower part of Georgia and ending in the lower part of Florida.

Zellerbach and Baruh Honored at Luncheon

● I. Zellerbach, chairman of the board, Zellerbach Paper Company, and chairman of the executive committee of the Crown Zellerbach Corporation, and his brother-in-law, M. M. Baruh, president of the California Cotton Mills Company, were honored at a luncheon given them last month, by J. D. Zellerbach, president of the Crown Zellerbach Corporation, and H. L. Zellerbach, president of the Zellerbach Paper Company, sons of I. Zellerbach.

The occasion for the luncheon, which took place at the San Francisco Stock Exchange Club, with a small group of intimate friends present, was the seventy-fifth birthdays of I. Zellerbach and Mr. Baruh which fall in the same month.

Recent Visitors To Pacific Coast Cities

● A. R. Fortune, Rochester Paper Company, Rochester, Minn., visited the Pacific Coast last month.

● William F. Goldbeck, of the Chicago office of Hollingsworth & Whitney Company, was a recent Pacific Coast visitor.

● Mr. Wiggins of the Old Colony Envelope Company, Westfield, Mass., was a recent visitor to San Francisco and other Coast cities.

● W. Garrity, Munising Paper Company, Munising, Mich., was visiting the paper trade on the Coast recently.

Publishers' Newsprint Stocks Decline

● Reduction of newsprint stocks by American newspaper publishers which started in October continued through the end of December. With manufacturers' stocks showing the normal seasonal decline in the month, total stocks of reporting publishers and manufacturers were off 39,173 tons from the end of November.

Consumption of newsprint by reporting publishers increased 0.5 per cent in December over the total for December, 1939, while for the full year consumption was 4.6 per cent greater than in 1939. December use by reporting publishers was the second greatest December total in 12 years, being less than 1 per cent under the peak December, 1936, for that period.

United States newspaper publishers reporting to the American Newspaper Publishers' Association held 327,913 tons of newsprint on December 1, 1940. During the month they received 238,183 tons, used 256,036 tons and sold 1,180 tons, to leave stocks on hand of 308,880 tons at the end of the month. There were 47,592 tons in transit to these publishers at the end of the month, making total stocks on hand and in transit of 356,472 tons. This was equal to 43 days' supply at the December rate of consumption.

North American manufacturers' stocks on December 31, 1940, were 225,660 tons, which compared with 254,204 tons on November 30, 1940, and 258,846 tons on December 31, 1939.

Hughes Passing Cigars

● Howard F. Hughes, popular member of the sales force of the Paterson Pacific Parchment Company, San Francisco, was wearing a broad smile and passing out cigars when he came to work Feb. 3, for just the day before Mrs. Hughes had presented him with a son and heir, their first. The newcomer has been named Gareth Ennis, and he weighed in at 8 pounds, two ounces.

Lamberts Vacationing In California

● William G. Lambert, manager of the Salt Lake Division of the Zellerbach Paper Company, San Francisco, accompanied by Mrs. Lambert, came to San Francisco and Los Angeles last month for his annual mid-winter vacation.

National Paper Products Offers Plastic Tissue Cabinet

● The first interfolded toilet cabinet to be made of plastics was recently introduced by the National Paper Products Sales Company, selling agents for Crown Zellerbach Corporation.

The patented cabinet is said to have a number of features not found in the metal ones. Being made of plastic material the cabinets are enduring, unaffected by atmospheric conditions, rust-proof, have no enamel to chip or mar, will not stain or burn. A damp cloth will clean it like new. The curved top avoids the smoker problem.

A full face door simplifies the loading problem. After loading the door is securely closed by a snap lock. Interleaving of new supply is eliminated by the starting slots. The user conveniently starts the first sheet of each refill.

Each sheet dispenses smoothly and easily toward the user. New principle of sloping bottom keeps each sheet in full view.

The new plastic cabinets come in either jet black or snow white. Information concerning the new dispenser can be obtained from the company at 343 Sansome Street, San Francisco.

Senner To Buy Wrapping For BM&T in San Francisco

● Newly appointed buyer for Blake, Moffitt & Towne's wrapping paper department in San Francisco, is Fred M. Senner. Mr. Senner entered Blake, Moffitt & Towne in September of 1915 and the experience gained during the past 25 years qualifies him in his new position with a comprehensive knowledge of the entire wrapping paper field. He replaces F. E. Sargent who recently resigned.

Blake, Moffitt & Towne Add New Test Mark Items

● Blake, Moffitt & Towne, San Francisco, recently announced the addition of several new Test Mark items. These include a new style electric lamp, Teps (sanitary napkins) and Lip Saver cups.

The sixteen divisions of the company have exclusive distribution rights for these nationally advertised products.

Bonestell Handle New Paper Cup

● Bonestell & Co., San Francisco, are handling the new paper cup, Rol-Rim Spiral, manufactured by the Paper Container Corporation, Chicago, products of which company are distributed on the Coast by the Paper Cup and Specialty Company, Los Angeles.

Mielke and Whiteman To New York Meeting

● O. W. Mielke, general manager of Blake, Moffitt & Towne, is planning on attending the National Paper Trade Convention in New York. He will be joined by Roland R. Whiteman, wrapping paper sales manager, Los Angeles Division of the company.

Miss Kelly To Be Married

● Miss Polly Kelly, the charming receptionist at the Zellerbach Paper Company's San Francisco headquarters, became the target for Cupid's darts recently, and will shortly be married to Donald Hobbs, who is connected with the Meryle Publishing Company of New York.

Harold Zellerbach Attends Paper Meeting

● Harold L. Zellerbach, president of the Zellerbach Paper Company, San Francisco, and Mrs. Zellerbach, left last month for a trip to Kansas City, Chicago, the Paper Trade Convention in New York, and before they return home about the middle of March, they will have visited Havana and New Orleans also.

Ten Zellerbach Employees To Attend 35-Year Luncheon

● Ten employees of the Zellerbach Paper Company, San Francisco, will attend the dinner to be given in the Bay City by the member firms of the National Association of Manufacturers honoring men and women who have been with the member companies for 35 years or more.

Zellerbach Paper Offers New Type of Sales Help

● It was the Miniature Rooms at the Golden Gate International Exposition that provided the germ of the idea. If tiny replicas of fine furniture could have such appeal, why not miniatures of fine printing? So reasoned the Zellerbach Paper Company, whose headquarters are in San Francisco, and whose advertising staff had plenty of opportunity to study the influence of the art of minuscule on all who visited the Fair.

To have the idea was one thing—to actually produce something that would be both novel and of real value to the printer was quite another. But after eighteen months of research and work, the job is finished, and the Zellerbach Paper Company is proud to present—Impressions in Miniature—Designed for Selling—twin volume of information on how to make sales.

Actually, the books are not books at all, and those who would delve into their pages quickly find that they contain not pages of text, but three more miniatures, one in the form of a letterfile—one a mail box—and the third a box similar to that used for playing cards. Each, upon being opened, reveals, in turn, tiny letterheads, matching envelopes and miniature business cards developed in all types of typography, from classic to modern, and embodying many ideas in craftsmanship.

The purpose of the whole production is to give the printing salesman a new approach to the old story of fine business forms. Unquestionably any customer will have sufficient curiosity to want to know what the books contain, and once his attention is arrested the specimens themselves will practically do the selling job.

In order to assure the specimens being truly representative, the typography was all produced under the direction of the American Type Founders Company. Various colors and finishes of fine bond papers were used to add variety to the offering.

Those who have had a preview are enthusiastic in their endorsement of this "something new" in graphic arts promotion.

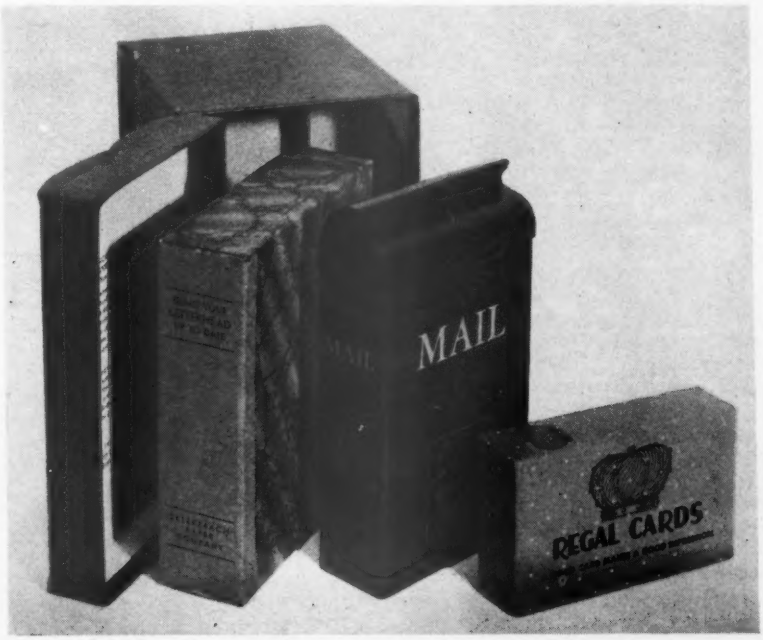
Los Angeles Division of BM&T Marks 50 Years of Service

● The year 1941 finds the Los Angeles Division of Blake, Moffitt & Towne celebrating its fiftieth anniversary, this important house in the Blake, Moffitt & Towne chain having been established in January 2, 1891, as a branch of the parent organization in San Francisco, which was founded in 1855.

An attractive booklet relating the interesting history of this pioneer paper organization has been produced and distributed as a souvenir of the occasion to members of the organization.

The booklet is most attractively printed and is entitled "Fifty Years." In it Walter W. Huelat, manager of the Los Angeles Division of Blake, Moffitt & Towne, has gathered much interesting historical information regarding the growth of the Los Angeles branch. Also included are brief biographies of Francis Blake, James Moffitt, and James W. Towne, the founders of the company.

Among other interesting items in the booklet is the fact that in 1903 the inventory of the Los Angeles branch showed only a few hundred items; today the inventory shows approximately 10,000 items, constituting one of the most comprehensive stocks in the country.



"Impressions in Miniature—Designed for Selling," a new type sales aid devised by the Zellerbach Paper Company, San Francisco, with the books open showing the containers for the miniature printed forms and letterheads.

Measurement of Vapor Pressures Of Sulfurous Acid Solutions

by W. L. BEUSCHLEIN*

THIS brief discussion will attempt to review some of the concepts concerning vapor pressure, how such pressure may be measured, and lastly some of the uses to which vapor pressures can be employed.

While all solids exert pressure, we most frequently think of liquids in connection with vapor pressures. A liquid is pictured as a mass of moving molecules, in haphazard motion. At a given temperature, a mean velocity can be assigned to a species of molecules, the very fast ones having sufficient energies to project themselves out beyond the liquid surface. These molecules form those of evaporation. At the boiling temperature, the mean velocity is such that the molecules bombarding the confining surface create a force equal to the external pressure and the molecules leave the liquid surface. If the boiling temperature is not reached, some of the molecules in the gaseous space return to the liquid, while others are projected into the gaseous space. This exchange continues until equilibrium is reached, whereupon the number of molecules leaving the liquid becomes equal to the number entering this phase. Equilibrium should be approached from two conditions, one representing an over supply of molecules in the gaseous phase, and one wherein too few molecules are present in the gas above the liquid.

It is known that the effect of temperature is the increasing of the vapor pressure. When the substances making up a solution are mutually soluble—as, for example, alcohol and water—the vapor pressure of each substance is reduced. Even when one of the substances is salt—which in solid form has a negligible vapor pressure—is dissolved in water, it reduces the vapor pressure of the water. When sulfur dioxide is dissolved in water, the escaping tendency of each is reduced, owing to the pressure of the other. Furthermore, when lime is dissolved in sulfurous acid solution—even though lime has a negligible vapor pressure as a solid—it reduces the vapor pressure of water and of sulfur dioxide molecules of the solution.

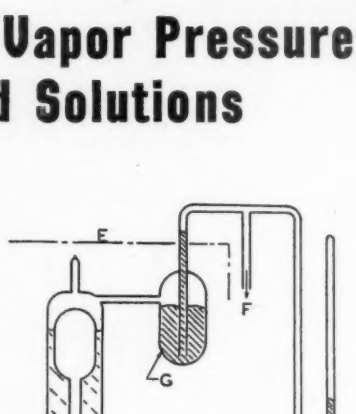


Figure 1

Apparatus used for pressure measurement of the system CaO—SO_2—H_2O. A flask containing the solution under investigation is placed in a water bath and agitated mechanically at a constant temperature. Attached to this flask is a mercury-filled manometer of the usual type, so that the gas pressure in the flask is directly in contact with the mercury. Measurements of the mercury pressure are made by means of a cathetometer. There are various ways of connecting the manometer to the glass flask. Where the manometer cannot be placed in the thermostat with the solution, it is necessary to establish some connection between the manometer set outside of the thermostat. A mercury relay can be set next to the flask and connected through a supply of air under pressure to the manometer placed at any convenient location. An example of this system is shown in the work reported by Simenson (Figure 1). A slightly more compact apparatus is shown in Figure 2, where the solution is placed over a quantity of mercury. This mercury forms one arm of the manometer. In all of these devices, it is necessary to stir the solutions, especially at the gas-liquid interface. The most rapid equilibrium is obtained when the stirring produces fresh liquid surfaces to the gas. The magnetic stirrers shown in some of these figures have proved to be very satisfactory. At each stroke of the solenoid, the glass plunger passes through the liquid-gas interface, offering fresh surfaces. The coils used for such purposes must have low electrical resistance, as heating of the solution is quite undesirable.

Solubility of Sulfur Dioxide In Water

● An example of measurements made on this system is that reported recently by Beuschlein and Simenson. A solution of sulfur dioxide in water was prepared and carefully analyzed. The apparatus of Figure 2 was set up. An oil bath in a metallic container was available for the constant temperature measurements. Since it was impossible to make observations through the sides of this container, the mercury relay as indicated was necessary. The experimental data obtained by Simenson are given in Figure 3 where pressures of sulfur dioxide in centimeters of mercury are plotted against temperatures in degrees Centigrade. In Figure 4, the vapor pressure of sulfur dioxide at a constant temperature is plotted against concentration. Work under way at the University plans for the presen-

W. L. BEUSCHLEIN, Presented paper on measurement of vapor pressures of sulfurous acid solutions.

*Professor of Chemical Engineering, Department of Chemistry and Chemical Engineering, University of Washington, Seattle. Presented at the dinner meeting sponsored by the Pacific Section of TAPPI at the Hotel Winthrop, Tacoma, Washington, February 4, 1941.

tation of data for sulfurous acid solutions containing lime over the temperature range of 0° to 40° C. The concentrations will be those usually found in absorption tower practice; that is, combined from 0 to 2.0 per cent and totals up to 5 per cent. As use of such data can be had for any temperature in the range, the operation of the absorption towers can be followed very accurately as the data now available in the literature have only 15° and 25° isotherms.

It has been demonstrated that sulfurous acid solutions containing combined sulfur dioxide follow Henry's law. These same investigations show that pressure of sulfur dioxide can be expressed as $P = H(t-2z)$, where P = pressure of sulfur dioxide, t and z are total and combined respectively. Inspection of this equation shows that on a plot of pressure vs. total concentration, the total intercept for zero pressure is at a point where the total equals twice the combine; or, where only calcium bisulfite is in solution. Since the bisulfite solutions containing a given combined follow Henry's law, linear in P and t, two points only are necessary to identify the pressure-composition relation at constant temperature. One point is definitely known when the combine is known; namely, $P = O$ where $t = 2z$. One point in addition must be known to fix the P-t relations for a solution of z combined. Such solutions are being investigated at the present time. It will be only necessary to have the pressure-temperature relation for a solution of known combined, and total sulfur dioxide content. The pressure at a given temperature can then be used to fix the pressure-composition curve at the temperature in question.

Such vapor pressure data are useful for the interpretation of the operation of the absorption towers in the acid plant of a sulfite pulp mill. The curves showing pressure-composition-temperature relations indicate qualitatively and quantitatively the greater absorption to be expected at the lower temperatures, the minimum combined permissible for a given total, and the available "driving force" for absorption. Perhaps this last property may be expanded.

The rate of absorption of sulfur dioxide from a flue gas by a calcium bisulfite soultion may be expressed as:

$W/A\Theta = K\Delta$,

where W = weight of sulfur dioxide absorbed.

A = area of gas-liquid interface.

Θ = time for absorption of W units.

K = absorption coefficient.

Δ = overall average force.

$$= \frac{\Delta p_1 - \Delta p_2}{2.3/09 \frac{\Delta p_1}{\Delta p_2}}$$

Δp_1 = driving force where strong gas enters.

Subscript 2 refers to weak gas exhaust.

The evalution of Δp is made by means of analyses of gas and solution, samples of which are representative of the section of the tower in question. From the gas analysis and absolute total pressure, the partial pressure of sulfur dioxide as p is calculated. The liquor analysis locates a point on an equilibrium pres-

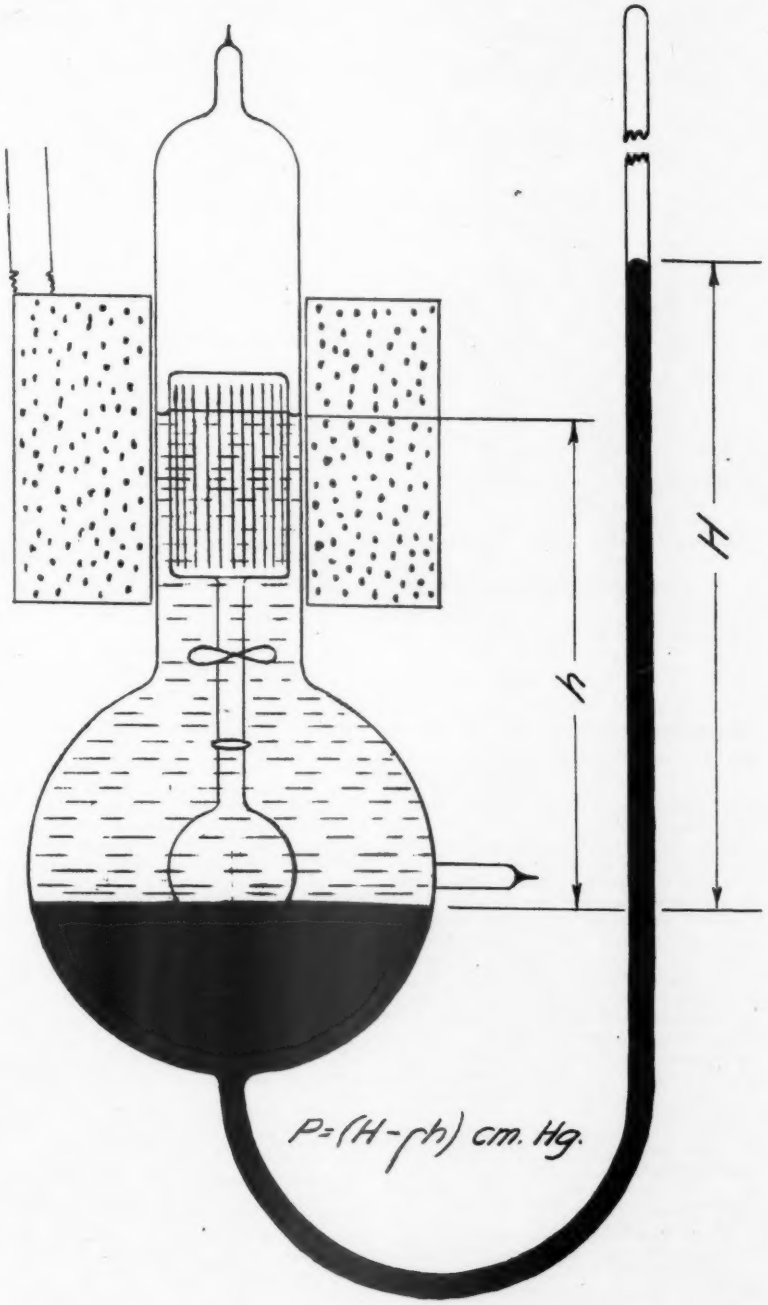


Figure 2

sure-composition diagram such that the equilibrium pressure P is known. From these determinations, p —P = △p, and this driving force holds for the section of absorption tower in question. Since the temperature varies a few degrees along the absorption tower, accurate equilibrium pressure-composition curves should be available over a working range of temperature.

An acid plant operator should evaluate his tower operation in terms of absorption coefficient "K." The clogging of water or acid sprays, the channelling of liquid or gas and the accumulation of insoluble clinkers will have the effect of decreasing A. The importance of each individually can be quantitatively measured. Likewise, the parts played by liquor velocity, gas velocity, gas concentration, temperature and other variables can be estimated.

The working over of dilute acid solutions for the recovery of sulfur dioxide in appreciable concentrations offers a promising field. Computations are similar to those for absorption, except that stripping is desired. Other uses for vapor pressure data are numerous.

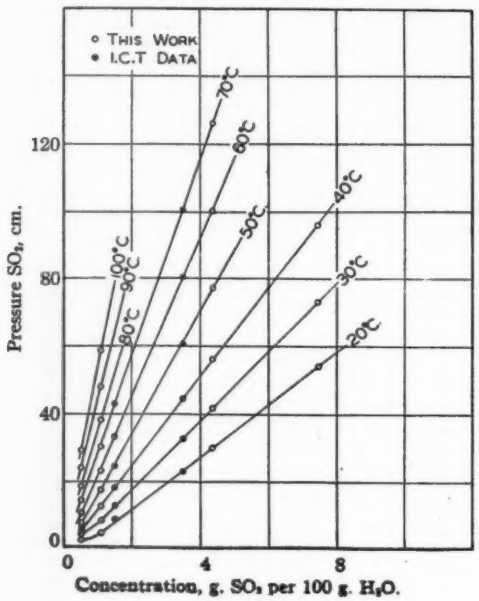


Figure 3

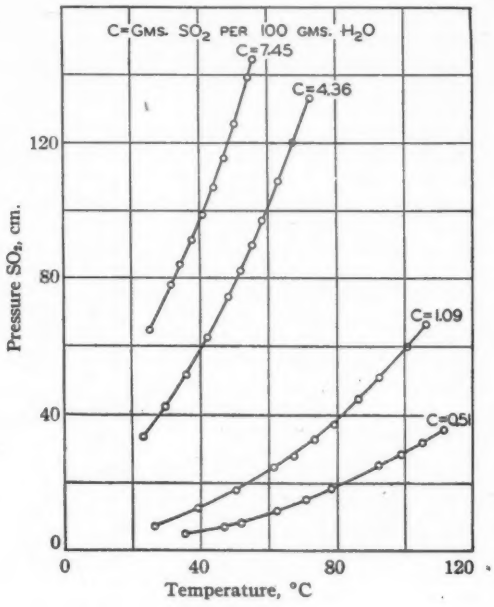


Figure 4

Manning Killed In Plane Wreck

● One of the best known figures in Pacific Northwest forestry circles, Ernest C. Manning, British Columbia's chief forester and assistant timber controller, was killed February 6th when the Trans-Canada plane in which he was flying west from Ottawa crashed in the Northern Ontario wildlands. Manning was one of twelve who lost their lives in the accident.

He was on his way back to the coast after going to Ottawa on official business in connection with the forest control. He had conferred with Loren A. Brown, timber controller, and H. R. MacMillan, Vancouver lumber leader now serving as chairman of Canada's Wartime Requirements Board.

When MacMillan was named timber controller last June one of his first acts had been to appoint Manning as his assistant. He continued in that office under Loren Brown.

In his early 50's, Manning was recognized as one of the Northwest's most progressive forest and timber authorities and he was highly regarded by pulp and paper men on both sides of the border. Ontario-born, he was educated at University of Toronto and before going to the British Columbia forest service in 1919 was with the forest department of the Canadian Pacific Railway.

In 1936, following the death of P. Z. Caverhill, Manning was appointed chief forester for British Columbia. He played an important part in organizing the province's program of conservation aiming at perpetuation of the forest industries.

Pulp Stocks at Low Point on January 1st

● At the end of 1940, it was estimated by reliable sources, the stocks of wood pulp in the United States were about half of those on hand the first of March, 1940.

Stocks of wood pulp at consuming, converting and producing mills and on docks were estimated at 470,000 short tons as of January 1st, 1941. On December 1st, 1940, an accurate check was made which showed 329,200 short tons at converting mills, 32,000 short tons available for sale at pulp mills, and 105,800 short tons of foreign pulp and 30,000 short tons of domestic pulp at the ports, making a total of 497,000 short tons. On March 1st, 1940, stocks were calculated at around 870,000 short tons.

Fibreboard at Stockton Adding Additional Storage

● Fibreboard Products, Inc., Stockton Division, have under construction an additional storage building 160x158 feet. This additional space is needed for the storage of semi-finished and finished products in order to still better service their customers. The new building was designed by Leland S. Rosener, San Francisco Engineer.

Last year the Stockton Division also added a modern, two-story, concrete building, 150x150 feet, to increase its carton manufacturing department, and at the Antioch Division a complete new corrugating box manufacturing department was added, 80x360 feet, making the former Corrugating Department space available for increased carton manufacturing.

Camas to Award 250 First Aid Certificates

● A first aid banquet will be held at Camas in Crown Willamette Inn, February 20th. Certificates are to be presented to those men and women completing the first year course and advanced first aid work at the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas. Some 250 persons are to attend the award dinner.

North American News Production Up 16%

● Production in Canada during December, 1940, amounted to 252,897 tons and shipments to 276,457 tons, according to the News Print Service Bureau. Production in the United States was 80,837 tons and shipments 84,037 tons, making a total United States and Canadian newsprint production of 333,734 tons and shipments of 360,494 tons. During December, 27,991 tons of newsprint were made in Newfoundland, so that the total North American production for the month amounted to 361,725 tons. Total production in December, 1939, was 344,805 tons.

The total North American output of newsprint paper in 1940 was 4,784,825 tons, of which 3,418,803 tons was made in Canada, 1,013,437 tons in the United States, and 352,585 tons in Newfoundland. The Canadian output was 19.2 per cent more than in 1939, that in the United States 7.9 per cent more, with a gain of 14.5 per cent in Newfoundland, making a total continental increase of 668,076 tons, or 16.2 per cent.

Stocks of newsprint paper at the end of December were 152,371 tons at Canadian mills and 13,455 tons at United States mills, making a combined total of 165,826 tons compared with 192,586 tons on November 30, 1940, and 182,454 tons at the end of December, 1939.

Canadian Mills Ask Tax Concessions

● Several Canadian pulp and paper companies have approached the finance department of the Canadian government for tax concessions on the ground that their operations provide the Dominion with foreign exchange needed for war purchases abroad.

Among the British Columbia companies in this category are British Columbia Pulp & Paper Company, Pacific Mills and Powell River Company, all of which have extensive selling connections in the United States.

Power to grant tax concessions to increase supplies of foreign exchange was given to Hon. J. L. Ilsley, Canadian minister of finance, by the Canadian parliament in December.

The intention, according to Ilsley, is not to subsidize exports, but to provide for special allowances for depreciation or depletion of capital assets under Canada's tax laws. That sort of help has been given to war industries.

Newsprint Canada's Largest 1940 Export

● Newsprint continued to constitute Canada's principal export in 1940, shipments being valued at more than $115,000,000. Apart from gold bullion, newsprint is regarded as the most important item in Canada's foreign trade inasmuch as it creates valuable foreign exchange in the United States, the principal market.

The funds obtained from the sale of newsprint in the United States ultimately find their way into wartime spending channels and return to the United States in payment for planes, tanks, shells and other war material.

More than 25 per cent of Canada's exports to the United States was represented by newsprint paper.

"Dick" Sandwell Dies in Tasmania

● Percy "Dick" Sandwell, chief engineer of Australian Newsprint Mills Proprietary, Ltd., and for many years one of the best known figures in Pacific Northwest pulp and paper mill engineering, died suddenly in Hobart, Tasmania, late in January.

He had just completed one of the biggest and most successful undertakings of his career—the supervision of construction of the Boyer mill of the Australian newsprint organization. It was a project made all the more difficult by the fact that it was essentially a pioneering job, partly experimental, carried out many thousands of miles from recognized pulp and paper manufacturing centers. Dick Sandwell was strictly "on his own," dependent for advice on no one but himself.

Only a few weeks ago Mr. Sandwell had written to Pacific Pulp and Paper Industry sending a picture of the new mill in the Derwent Valley and describing his work and that of his son, P. R. Sandwell, who has been appointed resident engineer for the Australian Newsprint Mills.

Mr. Sandwell's death brought sorrow to many people associated with the pulp and paper industry in the Northwest and in the east who recognized in him not only an engineer of rare skill and organizing genius but a man of many admirable personal qualities—a sincere and generous friend.

He was born in London, England, November 7, 1888, and received his education at public and technical schools. He was apprenticed at an early age to the mechanical and structural engineering firm of G. Ashton & Sons, London.

In 1908 Mr. Sandwell was appointed works engineer for Hales, Ltd., steam haulage contractors in London. Later he was appointed chief mechanical engineer for White City, Shepherd's Bush, and plant engineer for Gillman & Spencers, Ltd., food mills at Rotherhithe.

When the war broke out in 1914 he enlisted for military service with the Royal Field Artillery, and for several months was staff sergeant in charge of all mechanical equipment of the 72nd Brigade. He won his commission as an officer in the field, June, 1916, and transferred to the Royal Engineers. He was given several important assignments, including posts as works officer at Calais, division officer at St. Omer, staff officer and acting commander of Royal Engineers at Boulogne. Demobilized in 1920 from the army, he left England for Canada and arrived in Vancouver in May, 1920.

Mr. Sandwell's first job in British Columbia was in connection with construction of the Whalen Pulp & Paper Company's mill at Swanson Bay, since dismantled. In 1920-22 he was engaged by Powell River Company in construction work at Powell River, and then began a long association with British Columbia's premier newsprint organization. He became chief draftsman and assistant resident engineer and during that period the company was involved in a big construction program, including a new steam plant, reconstruction of the first hydro-electric plant, completion of a 250-ton newsprint development, the whole work representing an expenditure of some $8,000,000.

In 1926 he was appointed chief engineer for Powell River Company, and in the six years that followed additional steam plant extensions were carried out, together with a complete hydro-electric development at Lois River, with additions to the newsprint installation, groundwood and sulphite mill expansion, wharf building and so on, representing about $7,000,000.

From 1932 to 1934 he was assistant resident manager at Powell River, mainly in charge of operations.

He left Powell River to open his own office in Vancouver as consulting engineer. Among his more important clients were British Columbia Pulp & Paper Company, Crown Zellerbach Corporation and the Derwent Valley Paper Company, which consulted him in the earlier phases of the Australian paper project. When he was assigned to the job of designing and building Australia's first major newsprint mill he closed up his office in Vancouver which he had shared with Frank Sawford and left for "down under." That was in 1937. He did not return.

Men like A. E. McMaster, former vice-president and general manager of Powell River Company; R. Bell-Irving, vice-president of Powell River; Lawrence Killam, president of B. C. Pulp & Paper Company, regarded Mr. Sandwell as one of the outstanding technical men in the industry. He was a member of the Engineering Institute of Canada, a member of the Technical Association of the Pulp and Paper Industry, a member of the American Pulp and Paper Mill Superintendents Association, and a registered professional engineer of British Columbia.

Mr. Sandwell's wife, daughter Stephanie, and son, are now living in Tasmania.

Swedish Baltic Freight Rates Up

● The latter part of 1940 saw freight rates from Swedish to German ports at a high level compared with pre-war freight charges. The Swedish Wood Pulp Journal for November 30th commented:

"The firm all round tendency of the freight market inside the mine fields has also caused the freight rates for pulp to rise. The latest contracts to Stettin from the Lower Gulf have been made at 19 or 20 kronor per ton ($4.50 to $4.75 at the present value of the kronor, $.2385), while for the North Sea ports they have been as high as 25 kronor ($6.96) for dry chemical pulp. Small parcels of chemical pulp for Delfzijl (Northern Holland) have fetched 37½ kronor ($8.95) from Centre Gulf Sweden, and 35 kronor ($8.35) from districts between Gavle and Sundsvall. Tentative offers of 32½ kronor ($7.75) per ton are, for example, being made for wet pulp in the same direction from the Ornskoldsvik district."

The above rates are far higher than the pre-war freight charge of around $4 per ton on wood pulp from Swedish ports to United States Atlantic ports.

Envelopes of Pacific Coast Paper—

The Modern Plant of the Mail-Well Envelope Company of Portland, Uses Two Million Pounds of Paper Annually

Section of Mail-Well's paper warehouse ↓ ↓ ↓ Here is carried a stock of 108 different weights, grades and colors of Pacific Northwest paper.

A GROWING customer of the paper and board mills on the Pacific Coast is the Mail-Well Envelope Company of Portland, Oregon. Starting operations in 1927 with five employees, the company now has a modern plant with a staff of 46 men and women, and sells its products in the eleven Western states, Alaska and Hawaii.

More than 2,000,000 pounds of pa-

Cutting envelope blanks ↓ ↓ ↓ a precision steel die forced down through the pile of paper by a power press, cuts the desired form of envelope.

Window cutting ↓ ↓ ↓ Cutting the windows in the printed envelope blanks.

Printing the die-cut envelope blanks ' ' ' Envelopes are printed before folding.

Flat envelope blanks fed into this machine come out finished envelopes — glued and folded.

per is used annually and in addition the concern is a heavy buyer of boxboard, cartons and wrapping paper—other products of Pacific Northwest forests and mills.

Willette R. Lake is president and treasurer of the company and Clyde Ginn is secretary.

—Photographs through the courtesy of the Mail-Well Envelope Company, Columbia Empire Industries, Inc., and the Oregon Journal.

"Kangaroo" envelopes ' ' ' Catalog envelopes carrying personal letter in attached pouch.

Close-up view of gluing, window affixing, folding and sealing machine.

Wisconsin Pulp Mills Buying Idaho Spruce

During 1940 Wisconsin mills bought approximately 12,000,000 board feet of Idaho Englemann Spruce and are expected to take 40,000,000 feet in 1941.

ALTHOUGH it was in 1927 that the first wood was shipped from Idaho to pulp mills in Wisconsin, the early shipments were experimental and a sizeable volume did not develop until 1940. With the majority of pulp mills in Wisconsin dependent wholly or in part upon Canadian wood, their interest in supplies from Idaho was a natural outgrowth of the uncertainties of the Canadian supply caused by Canada becoming a belligerent, and also of their need for larger quantities due to increased demand for wood pulp.

The wood supplies of Idaho are now closer than the sources of most of the Canadian wood bought by Wisconsin mills. Today, it is said, the greater part of the Canadian wood travels 2,000 miles and requires several handlings before arriving at the mills. The Idaho wood is shipped entirely by rail and travels less than 1,500 miles.

A leader in developing the regular shipping of Idaho spruce to Wisconsin pulp mills is Stanley C. Vorachek, licensed public accountant of St. Maries, Idaho. At the present time Mr. Vorachek is serving with the Idaho National Guard at Camp Murray, Washington.

STANLEY C. VORACHEK Ships Idaho Spruce to Wisconsin Pulp Mills.

During 1940 Mr. Vorachek handled about 5,000,000 board feet out of the 12,000,000 board feet of logs shipped to Wisconsin mills, and during 1941 he expects to ship about half of the 40,000,000 board feet scheduled to move eastward.

The wood shipments are made up of about 80 per cent Engelmann spruce and 20 per cent white fir. The logs run from 12 to 40 feet in length, the latter being the maximum with a 40-inch butt after the first 6 feet of the butt has been cut away. All logs are peeled and are covered with canvas to protect them against dust storms as they cross the plains. Knots are cut out before loading from 20,000 to 22,000 board feet to the car.

The shipping season starts in July and ends in September. Except for a short period moisture prevents the logs from being taken out as they come from high altitudes, and another limiting factor is dust. Shipments are made only after the dust storms are generally past for the year. A third factor is that the logs cannot be stored in Idaho during the winter. They must be cut in the late spring and early summer. Most of the Wisconsin mills season the wood a year before pulping it.

The Idaho loggers receive about $12.50 per thousand board feet loaded on the cars. The total cost to the Wisconsin buyers is around $31.80 per thousand board feet, the difference being freight and other charges. Shipments are made from St. Maries and Clarkia, Idaho.

Mr. Vorachek has found that the buying mills are more interested in quality of the pulpwood than in the cost, desiring wood from high altitudes where the temperature is low the major part of the year.

He expects the shipments of spruce from Idaho to steadily expand unless a pulp mill is located in the area which would provide the local loggers with a more desirable market.

Mayhew Elected President Sidney Roofing

● Following a reorganization of executive personnel at Sidney Roofing & Paper Company at Victoria, B. C., the officers are now as follows: R. W. Mayhew, president; R. L. Mayhew, managing director; C. A. Mayhew, vice-president and treasurer; A. D. MacFarlane, secretary; M. W. Thom, superintendent; A. J. Saunders, plant engineer; D. Thom, chief boiler engineer.

During the present year the company is installing a 78-inch cylinder machine for felt paper manufacture.

Du Pont Develops New Flameproofing Treatment

● A new chemical for flameproofing paper and cloth has been developed by the research chemists of the Du Pont Experimental Station. Unlike previous chemicals, ammonius sulfamate does not stiffen the product treated nor does it crystallize upon the surface. Paper and cloth so treated will scorch but will not flame and will cease to burn when removed from a flame. Water soluble, it may be applied by dipping.

The new product is the result of a long and interesting series of research experiments. Ammonium sulfamate is made from sulfamic acid long known in the laboratory but never produced commercially because no simple, cheap process had been developed. Du Pont chemists evolved a commercial process by treating urea, itself made from nitrogen, carbon and hydrogen, with fuming sulphuric acid.

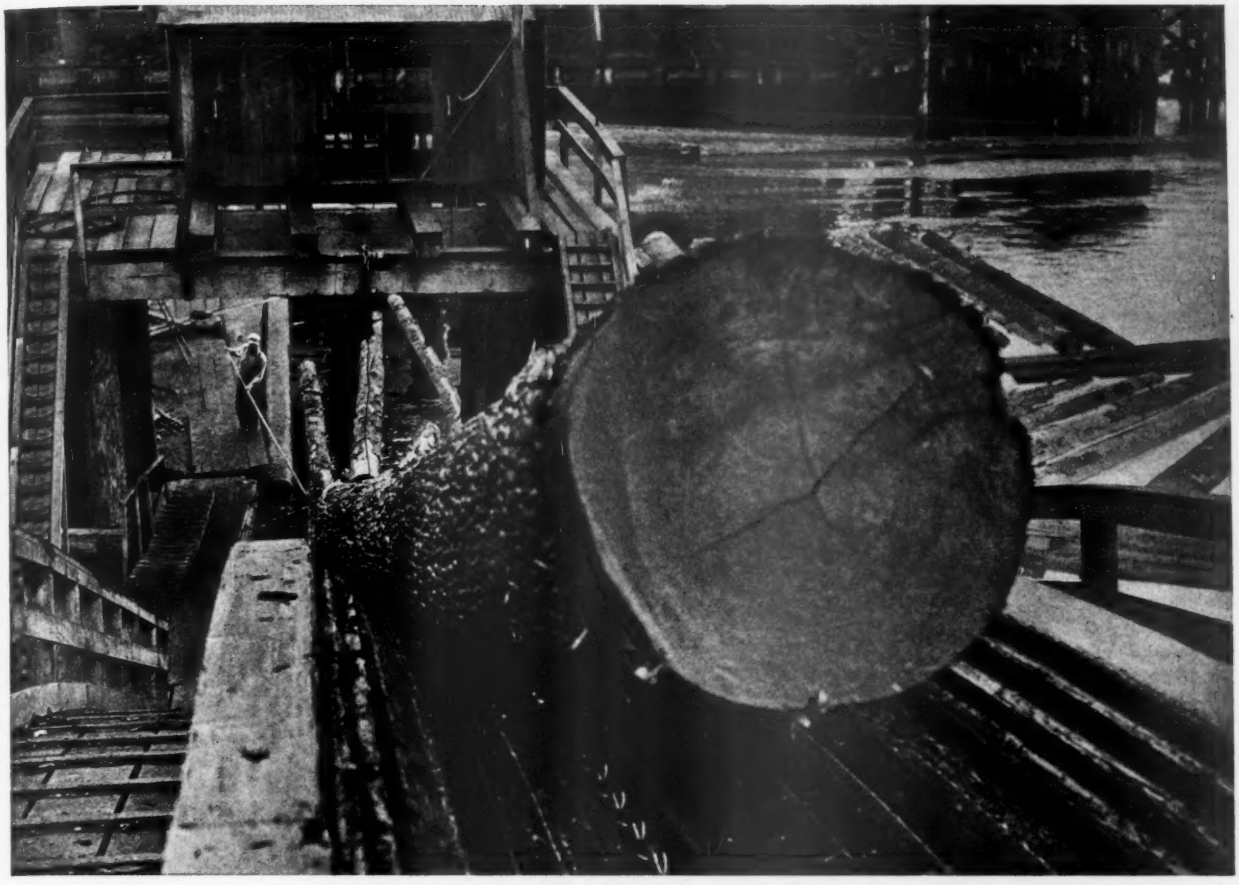
Other uses for sulfamic acid and its salts include weed killing in which it appears to have a selective action, as a tanning agent to produce finer grain on leather. It is expected that the new product will prove useful in extracting and purifying alkaloids such as quinine. Nicotine sulfamate is being experimented with as an insecticide. It may also find a place in modifying the alkilinity of soils and as an important agent in electroplating processes.

A full scale plant for the commercial manufacture of sulfamic acid is under construction by Du Pont at Grasselli, New Jersey, to be in operation early in April.

Progress Edition Uses 100 Tons of News

● The 1941 progress edition of the Spokesman-Review of Spokane, Washington, used more than 100 tons of newsprint manufactured by the Inland Empire Paper Company of Millwood, Washington, near Spokane.

This special edition of 170 pages and 120,000 copies appeared on January 26th.



First Step To Uniform Quality

UNIFORM QUALITY CONTROL OF RAYONIER PULPS begins with the careful selection of logs from one *species of tree.* Western Hemlock (illustrated) is used exclusively in Rayonier's four West Coast Mills and Southern Pine at Fernandina, Fla.

Shipment after shipment, you can rely on Rayonier Pulps for uniform physical and chemical characteristics.

Better Pulps For Better Performance

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Executive
343 Sansome Street
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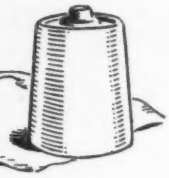
RAYONIER
INCORPORATED

For a continuous domestic source of supply

MILLS: HOQUIAM, PORT ANGELES, SHELTON, TACOMA, WASH.
FERNANDINA, FLA.

Rayon and other CHEMICAL USES OF WOOD PULP



On Dissolving Pulp

● In the December, 1940, "Industrial Bulletin," issued by Arthur D. Little, Inc., of Cambridge, Massachusetts, appeared the following interesting comment upon the dissolving pulp situation.

"Rapidly expanding munitions requirements for cellulose are being matched by a growing number of sources producing a grade suitable for chemical conversion. Superimposed upon the growing demand of the rayon, cellophane, plastics and lacquer industries for such cellulose, commonly termed dissolving pulp, is the demand of the new smokeless powder plants, three of which are now under construction and more of which are planned. As originally designed, each plant will consume roughly 18,000 tons of dissolving pulp per year, an amount equal approximately to that used in plastics and about 9 per cent of the cellulose consumed by the rayon industry.

"Cotton linters, the fuzz obtained from the cotton seed, were once almost the sole raw material for dissolving pulp and are still by far the dominant material used for acetate rayon, cellulose nitrate and acetate plastics, lacquers and smokeless powder. The viscose rayon and cellophane industry, consuming the bulk of the dissolving pulp, has, however, found it possible within the past 15 years to replace cotton linters almost entirely with a highly purified wood cellulose. There are now indications that, through improved pulping and bleaching processes, satisfactory and inexpensive wood cellulose may become available to the other industries now depending on linters.

"Within the wood-pulping industry there have been basic geographical and technical changes tending always to render useful the more plentiful and less expensive types of wood. Fifteen years ago the small production of dissolving pulp from wood in the United States was confined to mills using spruce in the northeastern states. Today the bulk of the dissolving pulp is obtained from western hemlock in the Pacific Northwest. Development of processes three years ago for pulping and bleaching hardwoods, such as maple and birch, which are plentiful in sections of the northeastern states where the conifers have been depleted, is permitting a partial reversal of this trend. Although logging and collection of the hardwoods is often more expensive than that of the conifers, the stands of hardwoods currently being worked are much closer to the rayon and other cellulose-using plants than is the western hemlock area. The more rapid replenishment of hardwood forests by second growth also favors use of hardwood over that of the more slowly growing spruce.

"A second shift has been toward the southeastern United States, where a plant successfully producing dissolving pulp from the highly resinous southern pine has been opened during the past year by one of the largest western dissolving-pulp companies. This development makes available to the higher grade markets the vast quantities of southern pine, which is cheap, fast-growing and situated close to many of the rayon mills. A product of this plant is said to be suitable for production of acetate rayon and other cellulose products currently relying for raw material on cotton linters, which will bear the brunt of the munitions demand. Because of the low cost of wood dissolving pulp as compared with cotton linters, the availability of a grade satisfactory for acetylation and nitration is of substantial importance to producers of plastics, lacquers and acetate rayon.

"Another possible low-cost source of high-grade cellulose is opened by recent investigations of pulping of bagasse, or sugar-cane fiber, indicating that use of a continuous nitric acid pulping process, now possible because of the availability of cheap acid and satisfactory corrosion-resisting equipment, might permit economic use of this agricultural by-product as an additional cellulose source.

"The supply of cotton linters, a by-product of the cottonseed oil industry, is strictly limited, but the amount of raw linters available is apparently greater than any immediately foreseeable demand, even for munitions use. The capacity of bleaching and purifying plants, two of which are planned for construction in the defense program, seems to be a more immediate limitation. In an emergency, however, both wood dissolving pulp and the large stocks of staple cotton which have been held on the market will be available to the smokeless powder plants, the first of which will operate in early 1941. Wood has long been used in Europe in smokeless powder manufacture. Thus, as pointed out in a recent statement of the National Defense Advisory Commission, the raw materials of the cellulose-using industries show little prospect of an emergency shortage.

World Rayon Production Sets New Record in 1940

● World's production of rayon in 1940 reached the record figure of 2,500,000,000 pounds, an increase of approximately one-quarter of a billion pounds compared with the output of 2,227,000,000 pounds reported for 1939, according to the Rayon Organon. For the first time in the history of the industry, world production of rayon staple fibre exceeded the output of filament yarn, due principally to the tremendous increase in the

production of the German staple fibre industry. Italy's production also increased, whereas Japan's remained at approximately the 1939 level.

These nations need for a substitute for foreign-grown cotton and wool has been the principal stimulus to the great growth of the world staple fibre industry over the past few years. In the span of a single decade, from 1930 to 1940, world output of staple fibre has increased from 6,000,000 to 1,350,000,000 pounds, a gain of 225 per cent.

The United States during the past year kept its position as the leading rayon yarn producing country, its output comprising 34 per cent of the world's total. Total United States production in 1940 was the highest on record, amounting to 471,200,000 pounds, compared with 379,900,000 pounds in 1939 and 127,700,000 in 1930. Consumption of rayon in this country also established a record peak last year, aggregating 487,800,000 pounds, a gain of 6 per cent compared with the previous record consumption of 458,465,000 pounds in 1939.

Domestic staple fibre consumption totaled 99,100,000 pounds last year, a figure about equal to the total of 98,717,000 pounds in 1939. United States production of staple fibre increased from 51,300,000 pounds in 1939 to 81,100,000 pounds in 1940, while imports dropped from 47,403,000 to 18,000,00 pounds.

Fiber "D"—A New Rayon That May Extend Rayon Usage

A new rayon fiber, with a high degree of permanent crimp, has been developed by the Du Pont Company. Lacking as yet a more formal title, it is known by its laboratory designation, Fibre "D." The use of this fiber is still somewhat experimental, but tests to date indicate that fabrics containing Fiber D possess certain characteristics now available only in wool.

The new fiber has performed satisfactorily in rugs, carpets, upholstery materials and wall coverings. It can also be used in other decorative fabrics.

The crimp, which gives bulk and loft to the yarns and the wool-like appearance and feel to the fabrics, is an inherent characteristic of Fiber D. If it is partially removed during processing, it may be recovered by simple treatments. This is a fundamental difference between Fiber D and earlier crimped rayon from which the crimp is easily lost.

An outstanding characteristic of the fiber is a smooth cross section, as contrasted to the "crenulated" or ridged pattern of standard rayons. This is claimed to enable fabrics made of it to shed dirt more effectively.

As with other rayons, Fiber D may be dyed to brilliant clear colors even in the lightest shades. This is of particular interest to designers of rugs, who have been unable to use light colors unless working with the carefully selected and expensive white wools. Luster can be controlled, as in other rayons. The fiber is mothproof and takes readily to treatment with antimildewing and fire-retarding preparations.

Carpet and rug manufacturers have displayed particular interest in the new fiber, as a safeguard against unstable prices and uncertainty of supply in carpet wools, the best grades of which are imported from India, China, Persia, Iraq, Syria, and other remote areas. Abrasion tests measuring the wearing properties of carpets showed "substantial improvement" over carpet wool in this service. Covering power of the fiber was described as extraordinarily high, giving a consequent richness to the fabric. When treated with "Zelan" textile finish, Fiber D acquires a soft hand that is indistinguishable from carpet wool.

In lighter yarns Fiber D gives to fabrics the feel and appearance of worsted. One manufacturer is offering a varied line of high-grade upholstery and drapery fabrics. One of these, a wall covering fabric, has just been installed in the new National Gallery of Art in Washington as a background for the Mellon art collection. The material, woven to give a hand-loomed effect, has a strength permitting it to be drawn tight without buckling. It was flameproofed and also treated against silverfish, tiny pests found in plaster and masonry.

Brown Company Reports Big Gain in Income

● The Brown Company, pulp and paper manufacturer of Berlin, N. H., reports for the year ending November 30, 1940, an operating profit of $3,093,125 against a deficit of $1,238,872 in the previous year. Net sales were $24,958,944 against $17,560,944.

U. S. Demands to Require Full Canadian Capacity

● Pulp requirements of the United States, arising from the national defense program, will call for capacity operation at all Canadian mills, according to E. W. Tinker, executive secretary of the American Pulp & Paper Association, who addressed a meeting of the Canadian Pulp & Paper Association this month in Montreal.

At the same time Mr. Tinker emphasized the vulnerability of the industry to possible post-war economic developments and warned that co-operative efforts of the industry and the government would be required to avert the danger of serious effects.

Dalton Retires From Inland Empire

● Harry H. Dalton, an engineer for the Inland Empire Paper Company at Millwood, Washington, for the past 22 years, has retired at the age of 80.

The Spokane Chronicle recently ran a picture of Mr. Dalton at work with a bucksaw cutting up old apple trees on his small farm near Millwood.

Royal Container Moving To New and Larger Plant

● The Royal Container Company, San Francisco, which started its business life in a very small way back in the gloomy days of 1931, has now become such a lusty infant that it is moving into a $250,000 plant at Millbrae, a few miles south of San Francisco.

"When the remodeling of our new plant is completed," said H. R. Freemon, president of the company, "it will be, I believe, the largest corrugated box factory under one roof on one floor on the Pacific Coast." Mr. Freemon has been in the paper box business in San Francisco for the past 20 years.

The plant, which formerly was occupied by a porcelain manufacturing concern, covers 175,000 square feet, and covers 10 acres. Heretofore Royal's operations have been scattered among five locations in San Francisco, now they will be concentrated at Millbrae.

Spur track facilities at the Millbrae plant to accommodate 30 carloads on the property are available.

Remodeling of the plant includes the building of a paper pit to handle between 2,500 and 3,000 tons of paper, and the installation of new cutoffs and other paper box and carton manufacturing machinery.

The company uses between 1,000 and 1,500 tons of box board per month, Mr. Freemon states.

Among the articles the company manufactures are shipping containers, paper board cartons, and paper bags for shipping mattresses, furniture, caskets, etc.

S. D. Squires, who was sales manager for Best Foods, Inc., for 17 years, is vice president and sales manager of the Royal Container Company.

H. R. FREEMON, President Royal Container Company.

Successfully Pulp Brazilian Pine

● Newly developed processes are reported to have made it possible to produce successfully chemical pulp employing Parana pine as raw material. This species of wood is found in great abundance both in the State of Parana and the State of Santa Catharina, Brazil. Experiments are now being conducted by the Chemical Institute of Parana, not only to establish the qualities of the new product but also to obtain a definite estimate of its cost and the real potentialities of the prospective industry.

While it has been announced officially that the results of the experiments have been satisfactory, they will be continued for some time. After they are concluded there will be submitted to the Brazilian Ministry of Agriculture samples of chemical pulp manufactured not only from pine but from the "samambaia" and other plants which can be used industrially.

Criticizes British Newsprint Imports

● Eric V. Bowater, chairman of Bowater's Paper Mills, in criticizing certain aspects of Britain's paper control arrangements at the company's annual meeting recently, stated that while mills in Britain are running at about 25 per cent capacity, the government is importing large quantities of newsprint from Newfoundland and Canada.

Mr. Bowater believes that requirements for newsprint in Britain could be filled by mills in the United Kingdom.

Paper production has been drastically curtailed in Britain since the war. Government control has made manufacture of newsprint less profitable than other grades of paper and board.

Mr. Bowater pointed out that while facilities for making groundwood pulp were not utilized to their fullest extent, though the government had offered to run its plant on a restricted scale of production, import facilities for pulpwood were refused.

Operating Ratios Holding Up Well

● The American Paper & Pulp Association's weekly production ratio report on paper production in the United States continues to show a rate of production close to that of a year ago.

For the week ending January 25th the ratio of production to capacity was 87.9 per cent, against 91.2 per cent of the same week a year ago. For the first four weeks of 1941 the rate was 86.8 per cent against 90.5 per cent for the same 1940 period.

The average of operations for 1940 showed improvement over 1939 with 87.5 per cent of capacity as compared with 84.9 per cent. The ratio was 72.3 per cent in 1938, 80.6 per cent in 1937, 81.3 per cent in 1936 and 70.5 per cent in 1935.

The paperboard industry's average for the year, as reported by the National Paperboard Association, was 73 per cent against 70 per cent for 1939, 61 per cent for 1938, 73 per cent for 1937, and 72 per cent for 1936. For the week ending January 25th the paperboard industry's operating ratio was 78 per cent.

Penn Salt Issues New Cement Booklet

● The Pennsylvania Salt Manufacturing Company has just issued a new booklet on "Asplit and Causplit Cements." These synthetic resin cements are resistant to corrosion and erosion and are employed in the chemical, pulp and paper, steel and allied processes.

The booklet describes the properties of Asplit and Causplit, the fields in which each excel, the methods of preparing the mortar and the surfaces to which they are to be applied. Warning is also given of mistakes in selecting the wrong cement for a given purpose and following the wrong procedure, which cause failure.

Copies may be obtained from the Pennsylvania Salt Manufacturing Company of Washington in Tacoma, or from the parent company, the Pennsylvania Salt Manufacturing Company, Widener Building, Philadelphia.

Australia Obtaining Waste Paper From New Zealand

● The U. S. Department of Commerce reports that the chairman of the New Zealand Council for the Reclamation of Waste Materials has announced that arrangements have been completed whereby the Botany Bay mill of Australian Paper Manufacturers Ltd. will take up to 200 tons of New Zealand waste paper each week, over and above the amounts taken by the two local mills. Collections will be organized at convenient points, from which the Salvation Army will collect, sort and bale the paper.

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